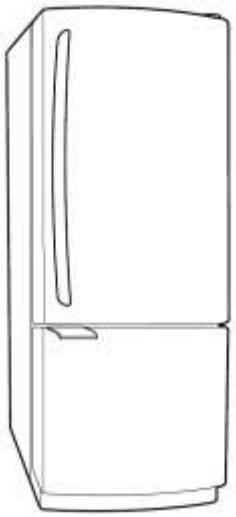
LG

REFRIGERATOR

SERVICE MANUAL

CAUTION
BEFORE SERVICING THE UNIT,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



MODELS:
LBC22520SB
LBC22520ST
LBC22520SW
LBC22520TT

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SAFETY PRECAUTIONS

Please read the following instructions before servicing your refrigerator.

1.Check the refrigerator for current leakage.

2.To prevent electric shock,unplug before servicing.

3.Always check line voltage and amperage.

4.Use standard electrical components.

5.Don't touch metal products in the freezer with wet hands.This may cause frost bite.

6.Prevent water from spiling on to electric elements or the Machine parts.

7.Before tilting the refrigerator, remove all materials from on or in the refrigerator.

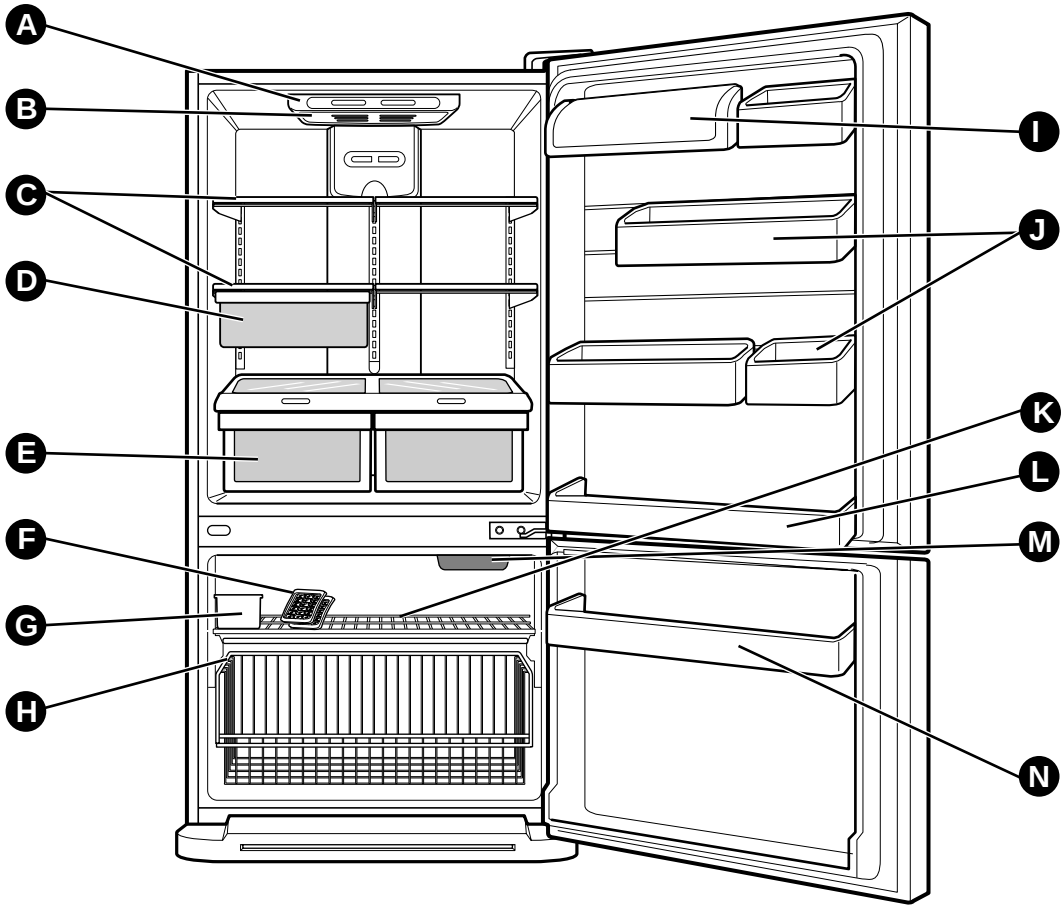
8.When servicing the evaporator, wear gloves to prevent injuries from the sharp evaporator fins.

9.Service on the refrigerator should be performed by a qualified technician.Sealed system repair must be performed by a CFC certified technician.

1. SPECIFICATIONS

SPECIFICATIONS	MODELS	LBC22520SW	LBC22520ST	LBC22520SB	LBC22520TT
GENERAL FEATURES	Color	Super White	Stainless/Light Noble Gray	Black	Titanium/Light Noble Gray
	Dimensions	32.8 (W) x 32.2 (D) x 68.5 (H) in.			
	Net Weight	125kg			
	Capacity	22 cuft			
	Refrigerant	R134a (120g)			
	Climate class	Temperate (N)			
	Rated Rating	115V~ / 60Hz			
	Cooling System	Fan Cooling			
	Temperature Control	MICOM control			
	Defrosting System	Full Automatic			
		Heater Defrost			
	Insulation	Cyclo, Pentane			
	Compressor	MC57LAUM PTC Starting Type			
	Evaporator	Fin Tube Type			
	Condenser	Wire Condenser			
	Lubricanting Oil	Polyol Ester ISO 10 220cc			
	Drier	MOLECULAR SIEVE XH-7			
	Capillary Tube	ID Ø0.75			
	First Defrost	4 Hours			
	Defrost Cycle	7 - 40 Hours			
	Desfrosting Device	Heater, Sheath			
	Anti-freezing Heater	Water Tank Heater			
REFRIGERATOR	Case Material	Embo (normal)			
	Door Material	PCM	Stainless	VCM	VCM
	Handle Type	Vista			
	Display Graphic	ICE PLUS			
	Basket, Quantity	2 1/3 + 2 2/3 + 1 full			
	Ice Tray & Bank	1B/(1EA)			
	Cover, T/V	Optibin Crisper + Humidity Ctl			
	Tray Drawer-F/L	Yes (Wire)			
	Lamp	Yes (2) 40W/Blue			
	Shelf	4EA (FIXED)			
	Tray meat	Yes			
	Egg Bank	No			
FREEZER	Basket, Quantity	Plastic (1)			
	Lamp	Yes (1) 40W/Blue			
	Shelf	Wire			

2. PARTS IDENTIFICATION



Use this section to become more familiar with the parts and features.

NOTE: This guide covers several different models. The refrigerator you have purchased may have some or all of the items listed below. The locations of the features shown below may not match your model.

- A Digital Sensor Control
- B Refrigerator Light
- C Shelves
- D Snack Pan
- E Optibin Crisper
  Keeps fruits and vegetable fresh and crisp
- F Ice Trays*
- G Ice Bin
- H Wire Durabase
- I Dairy Bin
- J Design-A-Door
- K Wire Freezer Shelf
- L Refrigerator Door Rack
- M Freezer Light
- N Freezer Door Rack

*on some models

3. DISASSEMBLY

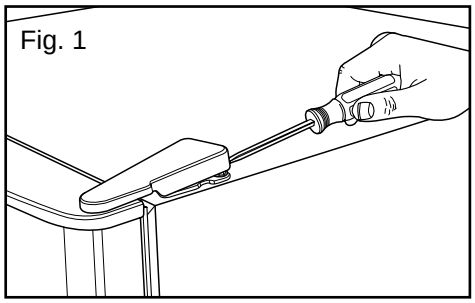
3-1. REFRIGERATOR DOOR

3-1-1. REMOVE REFRIGERATOR DOOR

Before removing the doors, remove the Base Grille.

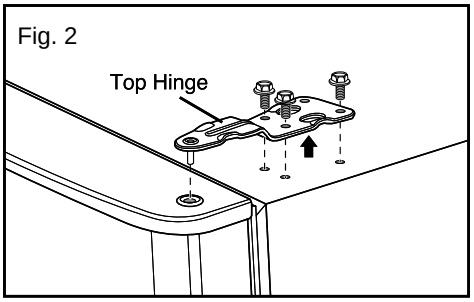
- Gently pry off the Top Hinge Cover with a flat head screwdriver and remove.

Fig. 1



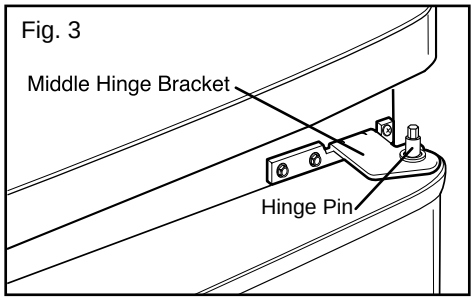
- Using 10mm or 13/32-inch socket wrench, remove the 3 bolts and lift off the Top Hinge. Set parts aside.

Fig. 2



- Lift up door slightly and remove it. Place door on a non scratching surface.

Fig. 3



- Using a 1/4 socket wrench, loosen and remove Hinge Pin from the Middle Hinge Bracket. Use a 10mm or 13/32 inch socket wrench to remove the 2 bolts in Middle Hinge Bracket. Remove screw. Set Middle Hinge Bracket and other parts aside.

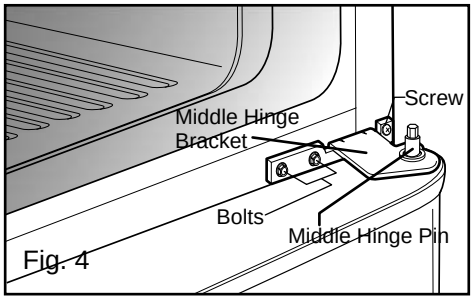
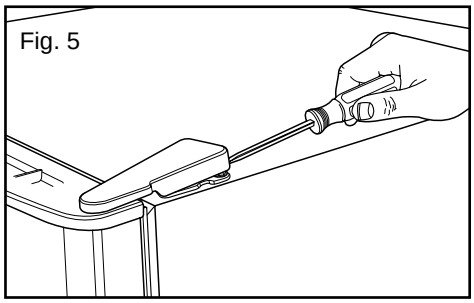


Fig. 4

3-1-2. REVERSE REFRIGERATOR DOOR

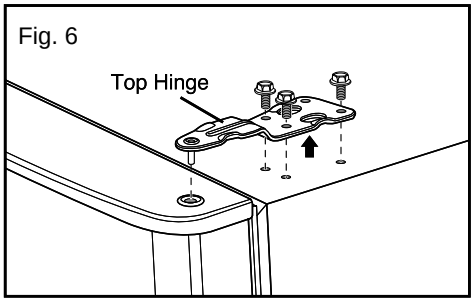
- Gently pry off the Top Hinge Cover with a flat head screwdriver and remove.

Fig. 5



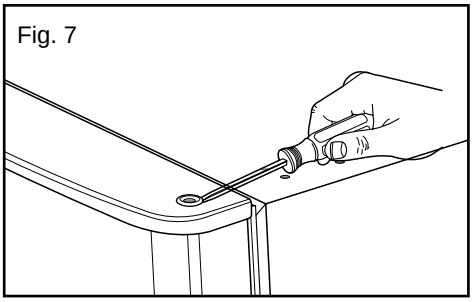
- Using 10mm or 13/32-inch socket wrench, remove the 3 bolts and lift off the Top Hinge. Set parts aside.

Fig. 6



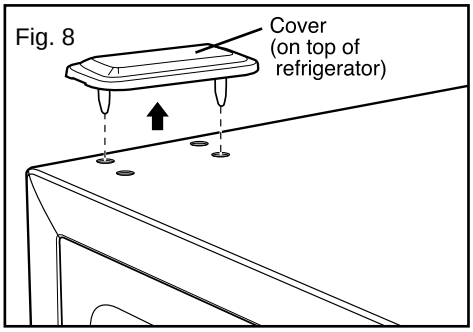
- Remove the right upper cap and place it on the left side.

Fig. 7

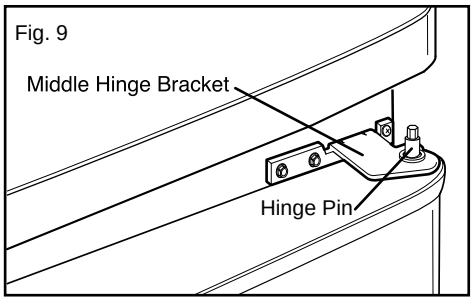


- Pry off cover on top of refrigerator on left side to uncover screw holes and place ir on the right side.

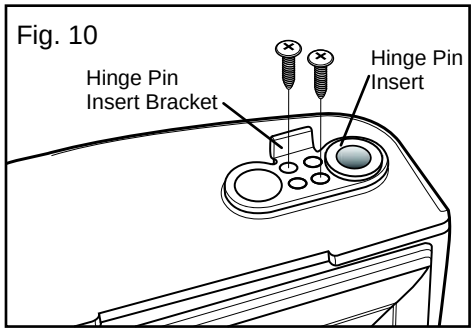
Fig. 8



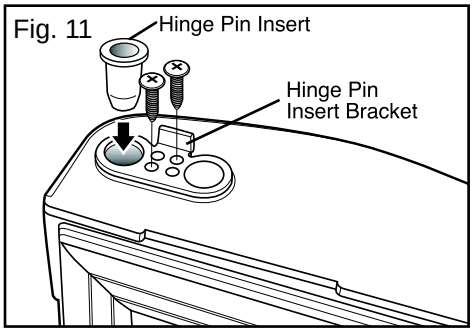
Lift up door slightly and remove it.



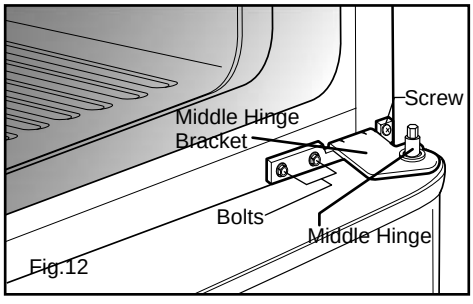
- Turn freezer door upside down on a non-scratch surface and remove the 2 screws and Hinge Pin Insert.



- Remove the 2 screw on the opposite side of the door.
- Move the Hinge Pin Insert Bracket to the other side of the door, keeping the same orientation, and move the Hinge Pin Insert into the hole on the left side of the bracket. Insert the 2 screws as shown below.



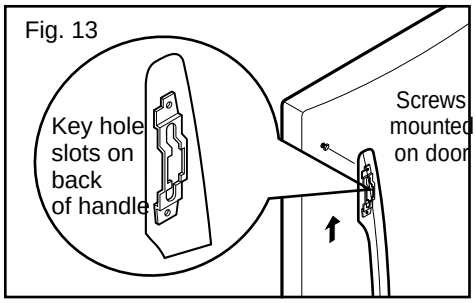
- Using a 1/4 socket wrench, loosen and remove Hinge Pin from the Middle Hinge Bracket. Use a 10mm or 13/32 inch socket wrench to remove the 2 bolts in Middle Hinge Bracket. Remove screw. Set Middle Hinge Bracket and other parts aside.



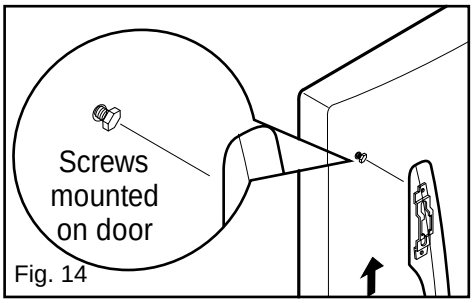
3-1-3. HOW TO REVERSE DOOR HANDLE

NOTE: To assist in installing the handle on the right side, place a small piece of masking tape near the top of the handle before removing.

- Grasp the handle tightly with both hands and slide the handle up (this may require some force).
- The keyhole slots on the back of the handle allow the handle to separate from the mounting screws.

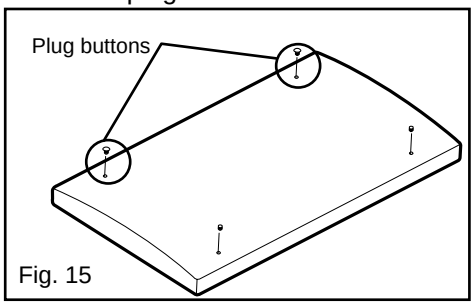


- Use an adjustable wrench to remove the 2 handle mounting screws.



- Carefully loosen the plug buttons with your fingers. The buttons can be unscrewed with your fingers, rotating the pieces counter clockwise, and then the piece will be loose and fall. The buttons were installed little pressure, for this reason the action can be done with your forefinger or thumb finger or with both.

- Install the plug buttons on the left side.



- Install the handle mounting screws on the right side.

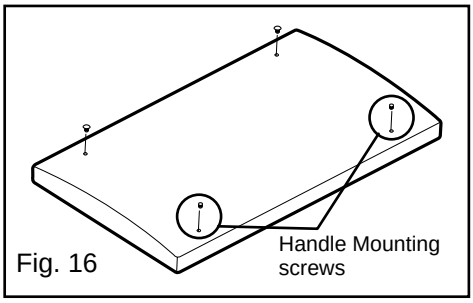


Fig. 16

- Hold the handle so the masking tape is at the bottom.
- Align keyhole slots on the top and bottom of the back of the handle with the screws mounted on the front of the door.
- Press the handle against the door front, making sure that the screws go into the keyhole slots.
- Grasping the handle with both hands, press it firmly against the front of the door and slide the handle down. This may require some force.

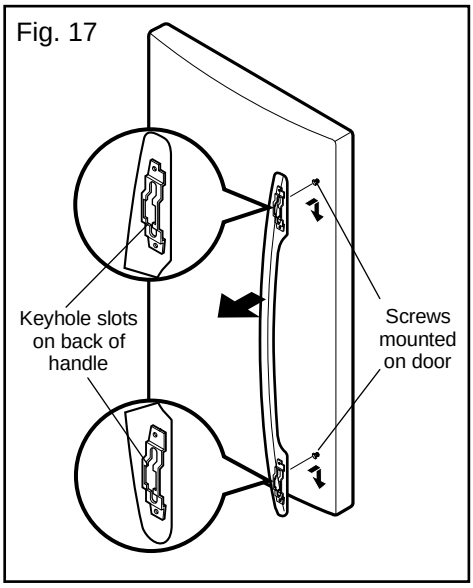


Fig. 17

3-2. FREEZER DOOR

3-2-1. REMOVE FREEZER DOOR

IMPORTANT: To avoid possible injury, product or property damage, you will need two people to perform the following instructions.

- Carefully lift up the door. Remove and place it on a non scratching surface.
- Using a 13/32" 10mm socket wrench with 2"extension, loosen the 2 bolts and remove bottom hinge from right side.

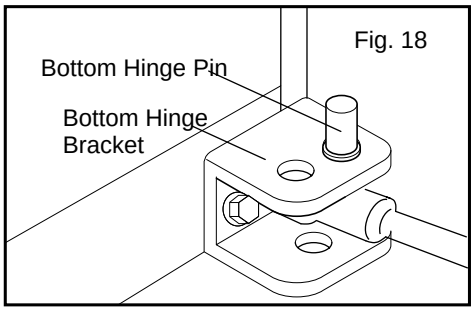


Fig. 18

- Put refrigerator door down over the Hinge Pin on the Middle Hinge Pin Bracket.

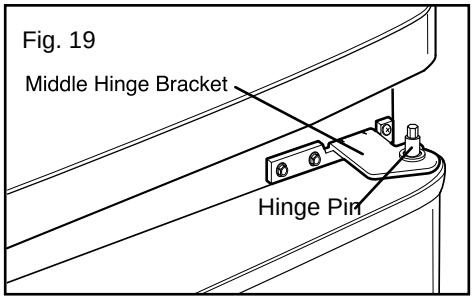


Fig. 19

- Line up Top Hinge with holes in top of refrigerator. Use the 3 bolts to replace the Hinge.

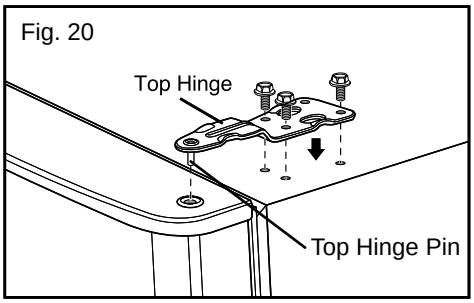


Fig. 20

Tighten Bolts. Force-fit Top Hinge Cover over top Hinge.

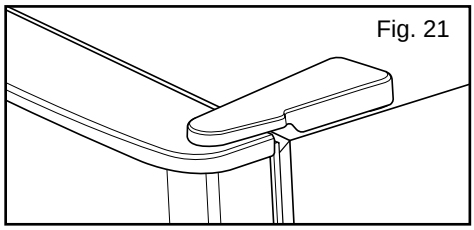


Fig. 21

3-2-2 REVERSE FREEZER DOOR

IMPORTANT: To avoid possible injury, product or property damage, you will need two people to perform the following instructions.

Carefully lift up the door. Remove and place it on a non scratching surface.

- Using a 13/32" 10mm socket wrench with 2"extension, loosen the 2 bolts and remove bottom hinge from right side.

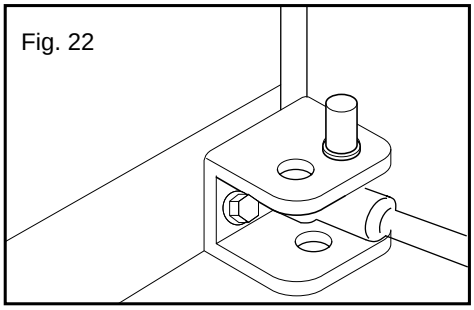


Fig. 22

Remove the bolt on bottom of refrigerator from the left side and insert it on the right side.
You will need this hole for the Bottom Hinge.

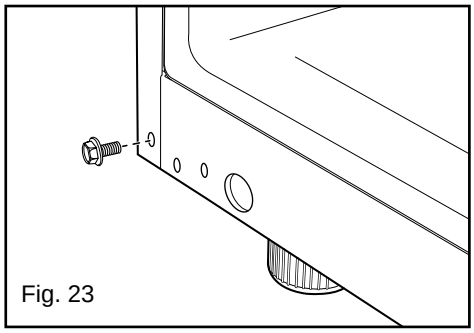


Fig. 23

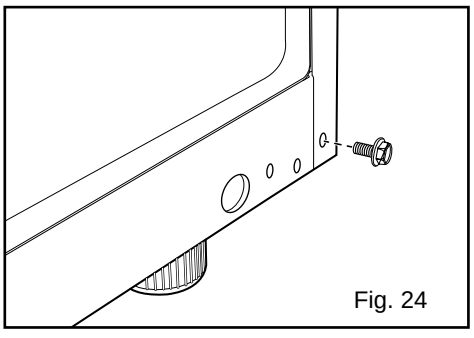


Fig. 24

- Change the Hinge Pin from the right side to left side.

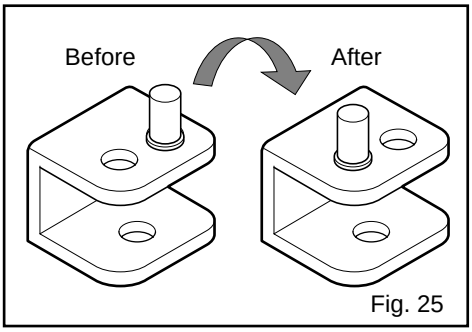


Fig. 25

- Move the Bottom Hinge to the left side keeping the same orientation and attach 2 bolts.

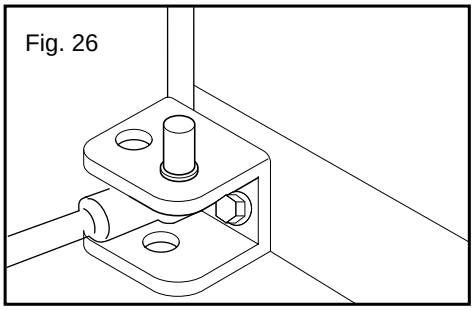


Fig. 26

- With a flat-head screwdriver, carefully pry off and remove the cover over the screw holes on the left side of refrigerator housing.

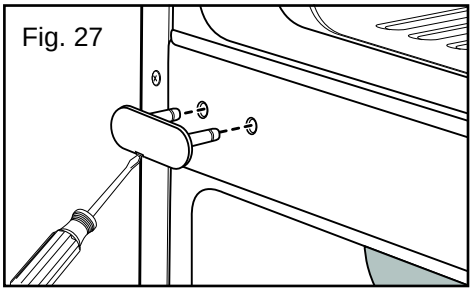


Fig. 27

- Remove the 2 outer screws from cabinet at area between refrigerator and freezer doors.
(You will need these holes for the Middle Hinge Bracket.)

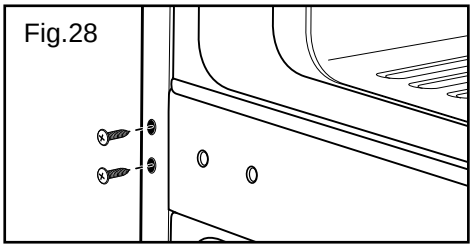


Fig.28

- Place screws into outer hole on right side of cabinet. Attach cover on the right side. Cover is force-filted.

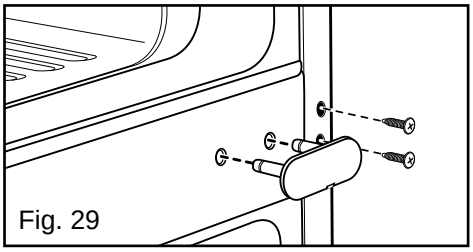


Fig. 29

- Flip the middle hinge bracket (flange now will be on top) and position on left side of refrigerator and re-attach with two bolts and a phillips screw.

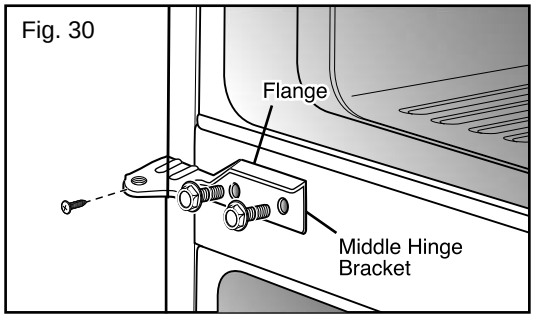


Fig. 30

- Put freezer door down over the Bottom Hinge Pin on the Bottom Hinge Bracket.
- Attach Middle Hinge Pin.
- Put refrigerator door down over the Hinge Pin on the Middle Hinge Pin Bracket.

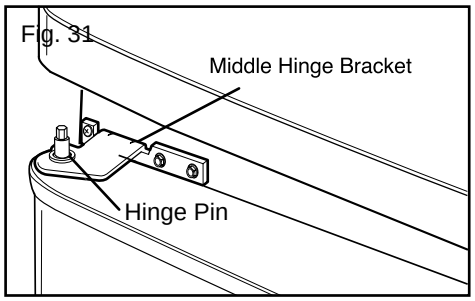


Fig. 31

- Line up Top Hinge with holes in top of refrigerator. Use the 3 bolts to replace the Hinge.

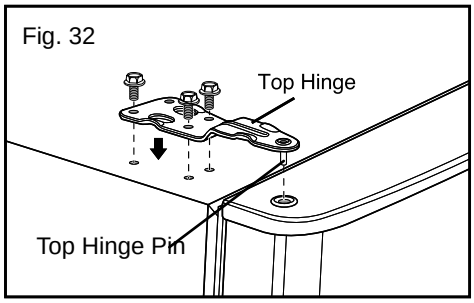


Fig. 32

- Tighten Bolts. Force-fit Top Hinge Cover over top Hinge.

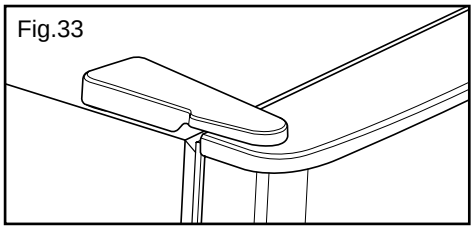


Fig.33

- Replace cover from left side of refrigerator top onto the right of top to cover holes. Cover is also force-fitted.

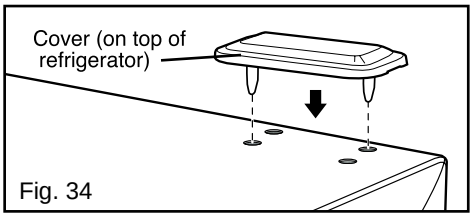


Fig. 34

3-2-3. HOW TO REPLACE FREEZER AND REFRIGERATOR DOORS

- Reattach Bottom Hinge attaching the 2 bolts
- Reattach Middle Hinge Bracket with two bolts and a phillips screw.

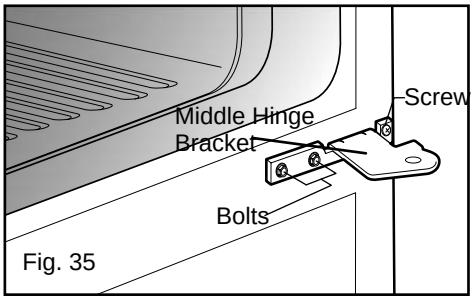


Fig. 35

- Place freezer door down on Bottom Hinge Pin.
- Using a 1/4 socket wrench install Hinge Pin to Middle Hinge Bracket.

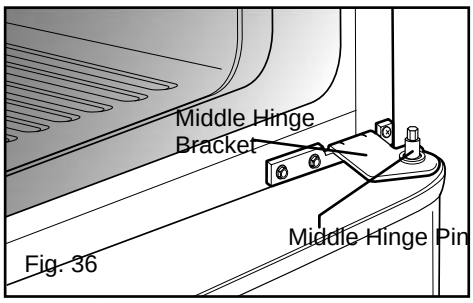


Fig. 36

3-3. FAN AND FAN MOTOR

1. Remove the freezer shelf. (If your refrigerator has an icemaker, remove the icemaker first).
2. Remove the plastic guide for slides on left side by unscrewing phillips head screws.
3. Remove the grille by removing one screw and pulling the grille forward.
4. Remove the Fan Motor assembly by loosening 2 screw and disassemble the shroud.
5. Pull out the fan and separate the Fan Motor and Bracket.

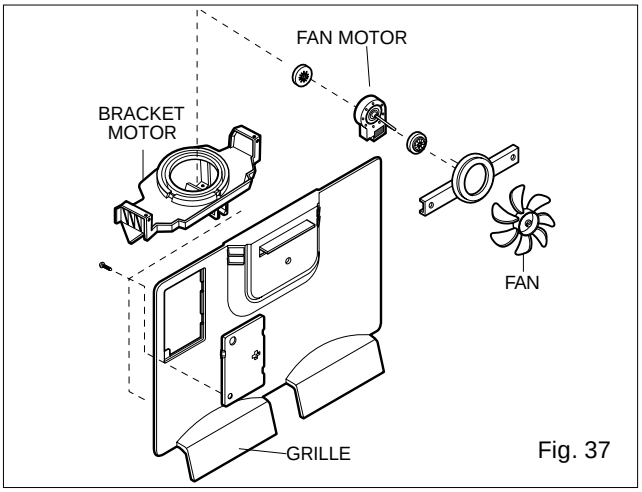


Fig. 37

3-4. DEFROST CONTROL ASSEMBLY

Defrost Control assembly consist of Drefrost Sensor and FUSE-M.

The Defrost Sensor works to defrost automatically. It is attached to the metal side of the Evaporator and senses its temperature.

Fuse-M is safety device for preventing over-heating of the Heater when defrosting.

At 72°C, it turns the Defrost Heater off.

1. Pull out the grille assembly. (Figure 46)
2. Separate the connector with the Defrost Control assembly and replace the Defrost Control assembly after cutting the Tie Wrap. (Figure 47)

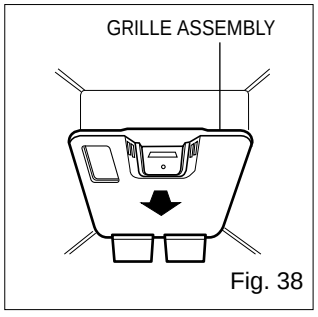


Fig. 38

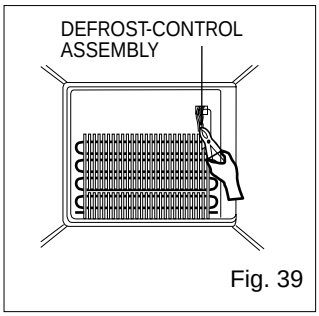


Fig. 39

3-5. LAMP

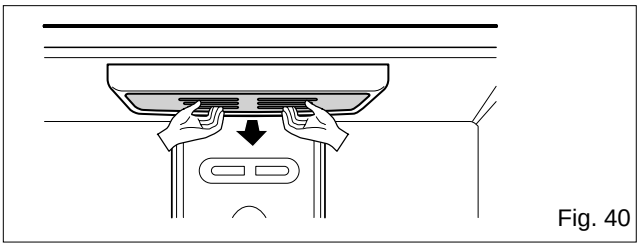


Fig. 40

3-5-1. REFRIGERATOR COMPARTMENT LAMP

1. Unplug the power cord from the outlet.
2. Remove Refrigerator shelves.
3. Release the hooks on both ends of the lamp shield and pull the shield downward to remove it.
4. Turn the lamp counterclockwise.
5. Assemble in reverse order of disassembly.
6. Replacement bulb must be the same specification as the original (Max. 60 W-2EA).

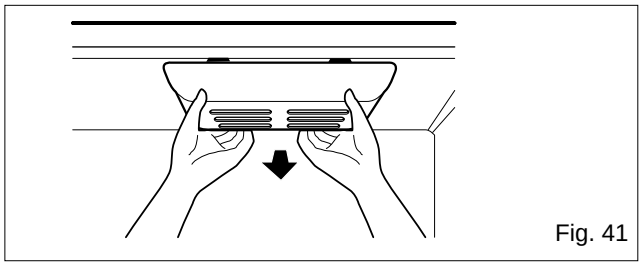


Fig. 41

3-5-2. FREEZER COMPARTMENT LAMP

1. Unplug refrigerator or disconnect power.
2. Reach behind light to remove bulb.
3. Replace bulb with a 60W appliance bulb.
4. Plug in refrigerator or reconnect power.

3-6. CONTROL BOX-REFRIGERATOR

1. First, remove all shelves in the refrigerator, than remove the Refrigerator control Box by loosening 2 screws.

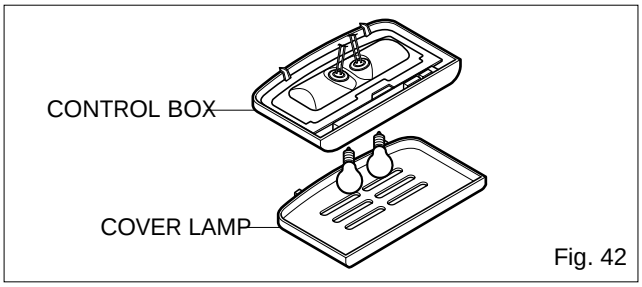


Fig. 42

2. Remove the Refrigerator Control Box by pulling it downward.

3. Disconnect the lead wire on the right position and separate the lamp sockets.

3-7. MULTI DUCT

1. Remove an upper and lower Cap by using a flat screwdriver, and loosen 2 screws. (Figure 43)

2. Disconnect the lead wire on the botton position.

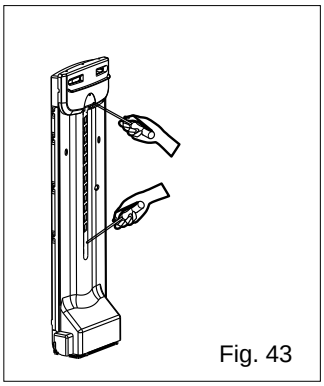
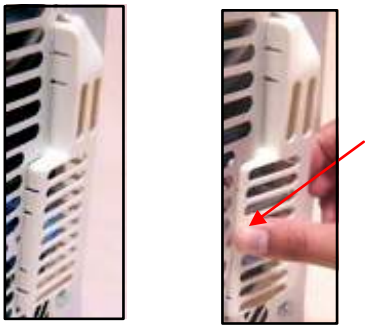


Fig. 43

3-8. COVER VALVE

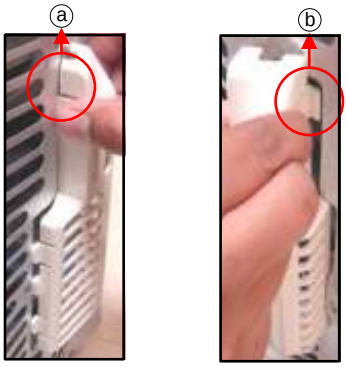
3-8-1. DISASSEMBLE

1. Push to inside the cover valve.



2. Push to the right and release.

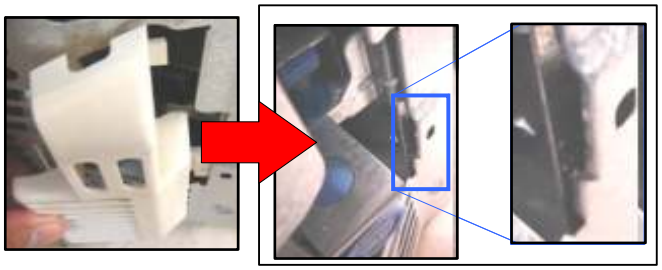
3. Release hook ⓐ&ⓑ



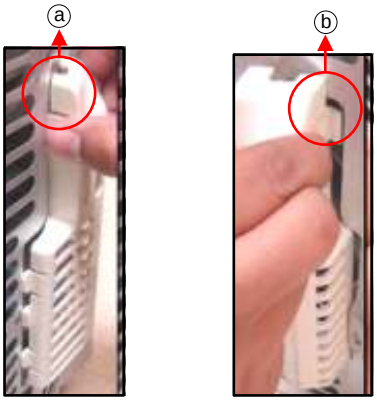
4. Turn the cover valve 120° as shown in the picture, then release it.

3-8-2. ASSEMBLE

1. Insert the cover valve as shown in the picture, push to insert (may need force).

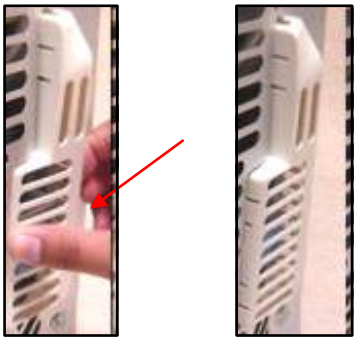


2. Insert hook ⓐ&ⓑ



3. Push to the right to insert the cover valve.

4. Then push to inside to assembly.



4. ADJUSTMENT

4-1 COMPRESSOR

4-1-1 Role

The compressor intakes low temperature and low pressure gas from the evaporator of the refrigerator and compresses this gas to high-temperature and high-pressure gas. It then delivers the gas to the condenser.

4-1-2 Composition

The compressor includes overload protection. The PTC starter and OLP (overload protector) are attached to the outside of the compressor. Since the compressor is manufactured to tolerances of 1 micron and is hermetically sealed in a dust and moisture-free environment, use extreme caution when repairing it.

4-1-3 Note for Usage

(1) Be careful not to allow over-voltage and over-current.

(2) If compressor is dropped or handled carelessly, poor operation and noise may result.

(3) Use proper electric components appropriate to the Particular Compressor in your product.

(4) Keep Compressor dry.
If the Compressor gets wet (in the rain or a damp environment) and rust forms in the pin of the Hermetic Terminal, poor operation and contact may result.

(5) When replacing the Compressor, be careful that dust, humidity, and soldering flux don't contaminate the inside of the compressor. Dust, humidity, and solder flux contaminate the cylinder and may cause noise, improper operation or even cause it to lock up.

4-2 PTC-STARTER

4-2-1 Composition of PTC-Starter

(1) PTC (Positive Temperature Coefficient) is a no-contact semiconductor starting device which uses ceramic material consisting of $BaTiO_3$.

(2) The higher the temperature is, the higher the resistance value. These features are used as a starting device for the Motor.

4-2-2 Role of PTC-Starter

(1) The PTC is attached to the Sealed Compressor and is used for starting the Motor.

(2) The compressor is a single-phase induction motor. Durign the starting operation, the PTC allows current flow to both the start winding and main winding.

4-2-3 PTC-Applied Circuit Diagram Starting Method for the Motor

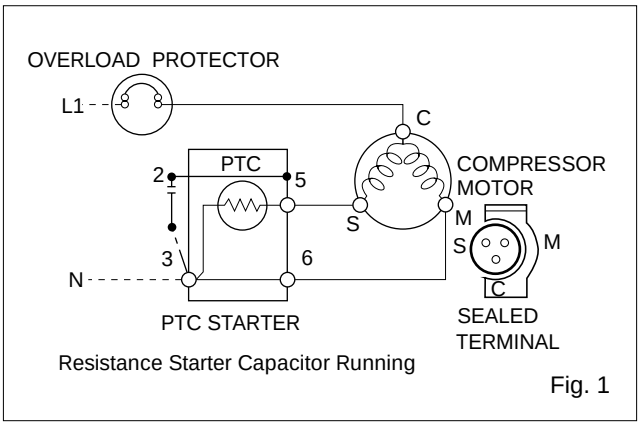


Fig. 1

4-2-4 Motor Restarting and PTC Cooling

(1) It requires approximately 5 minutes for the pressure to equalize before the compressor can restart.

(2) The PTC device generates heat during operation. Therefore, it must be allowed to cool before the compressor can restart.

4-2-5 Relation of PTC-Starter and OLP

(1) If the compressor attempts to restart before the PTC device is cooled, the PTC device will allow current to flow only to the main winding.

(2) The OLP will open because of the over current condition. This same process will continue (3 to 5 times) when the compressor attempts to restart until the PTC device has cooled. The correct OLP must be properly attached to prevent damage to the compressor.
Parts may appear physically identical but could have different electrical ratings. Replace parts by part number and model number. Using an incorrect part could result in damage to the product, fire, injury, or possibly death.

4-2-6 Note for Using the PTC-Starter

(1) Be careful not to allow over-voltage and over-current.

(2) Do not drop or handle carelessly.

(3) Keep away from any liquid.
If liquid such as oil or water enters the PTC, PTC materials may fail due to breakdown of their insulating capabilities.

(4) If the exterior of the PTC is damaged, the resistance value may be altered. This can cause damage to the compressor and result in a no-start or hard-to-start condition.

(5) Always use the PTC designed for the compressor and make sure it is properly attached to the compressor. Parts may appear physically identical but could have different electrical ratings. Replace parts by part number and model number. Using an incorrect part could result in damage to the product, fire, injury, or possibly death.

4-3 OLP (OVERLOAD PROTECTOR)

4-3-1 Definition of OLP

(1) OLP (OVERLOAD PROTECTOR) is attached to the Compressor and protects the Motor by opening the circuit to the Motor if the temperature rises and activating the bimetal spring in the OLP.

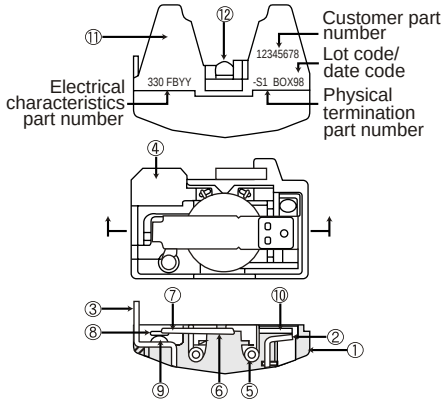
(2) When high current flows to the Compressor motor, the Bimetal works by heating the heater inside the OLP, and the OLP protects the Motor by cutting off the current flowing to the Compressor Motor.

4-3-2 Role of the OLP

(1) The OLP is attached to the Sealed Compressor used for the Refrigerator. It prevents the Motor Coil from being started in the Compressor.

(2) For normal operation of the OLP, do not turn the Adjust Screw of the OLP in any way.

(OVERLOAD PROTECTOR cross section)



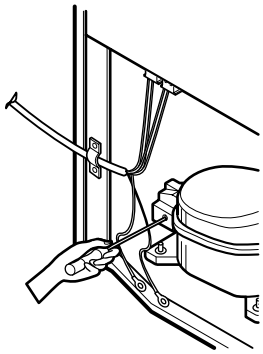
Part No.	Name	Part No.	Name
①	Base, phenolic (UL 94 V-0 rated)	⑦	Movable arm, spring temper copper alloy
②	Movable arm support, plated steel.	⑧	Contact, movable, silver on copper
③	Stationary contact support, plated steel	⑨	Contact, stationary, silver on copper
④	Heater support, plated steel	⑩	Slug, plated steel
⑤	Heater, resistance alloy	⑪	Cover, polyester (UL 94 V-0 rated)
⑥	Disc, thermostatic alloy	⑫	Pin connector, plated copper alloy (To engage 2.33/2.66 mm dia. pin)

Fig. 2

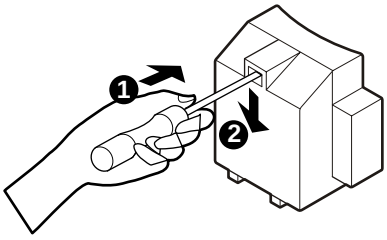
4-4 TO REMOVE THE COVER PTC

(1) Remove the screws on the Cover Back and take it out.

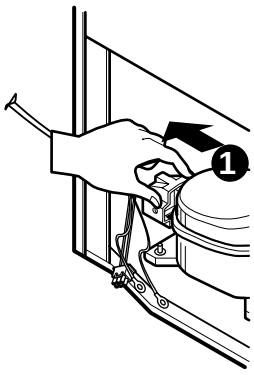
(2) Remove the screw on Cover PTC.



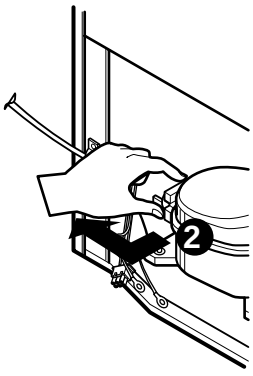
(3) Insert a screwdriver into the Cover PTC hole and pull it down.



(4) Remove the Cover PTC.



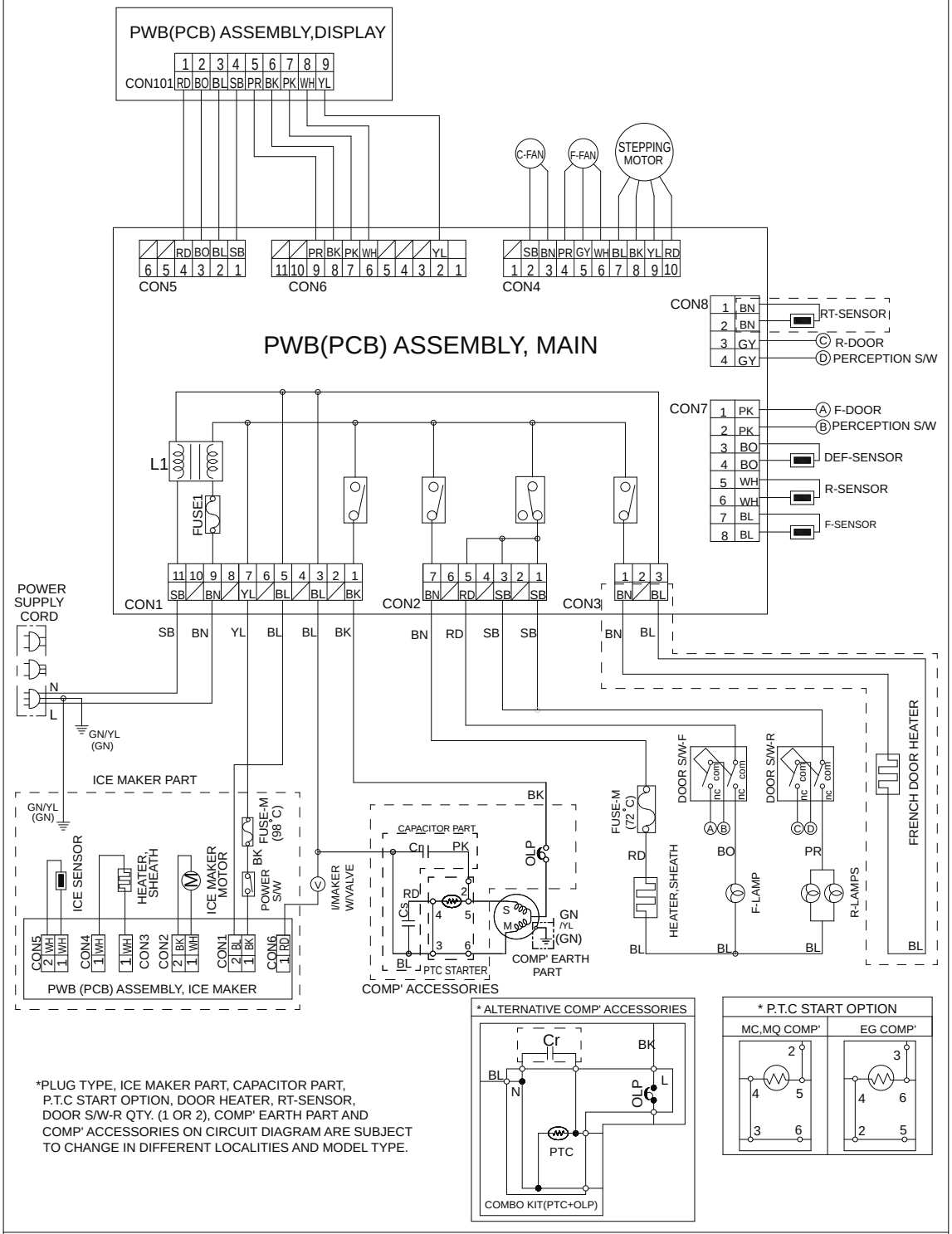
(5) Remove PTC carefully pulling the edges.



(6) Assembly in reverse order of disassembly.

5. CIRCUIT DIAGRAM

CIRCUIT DIAGRAM

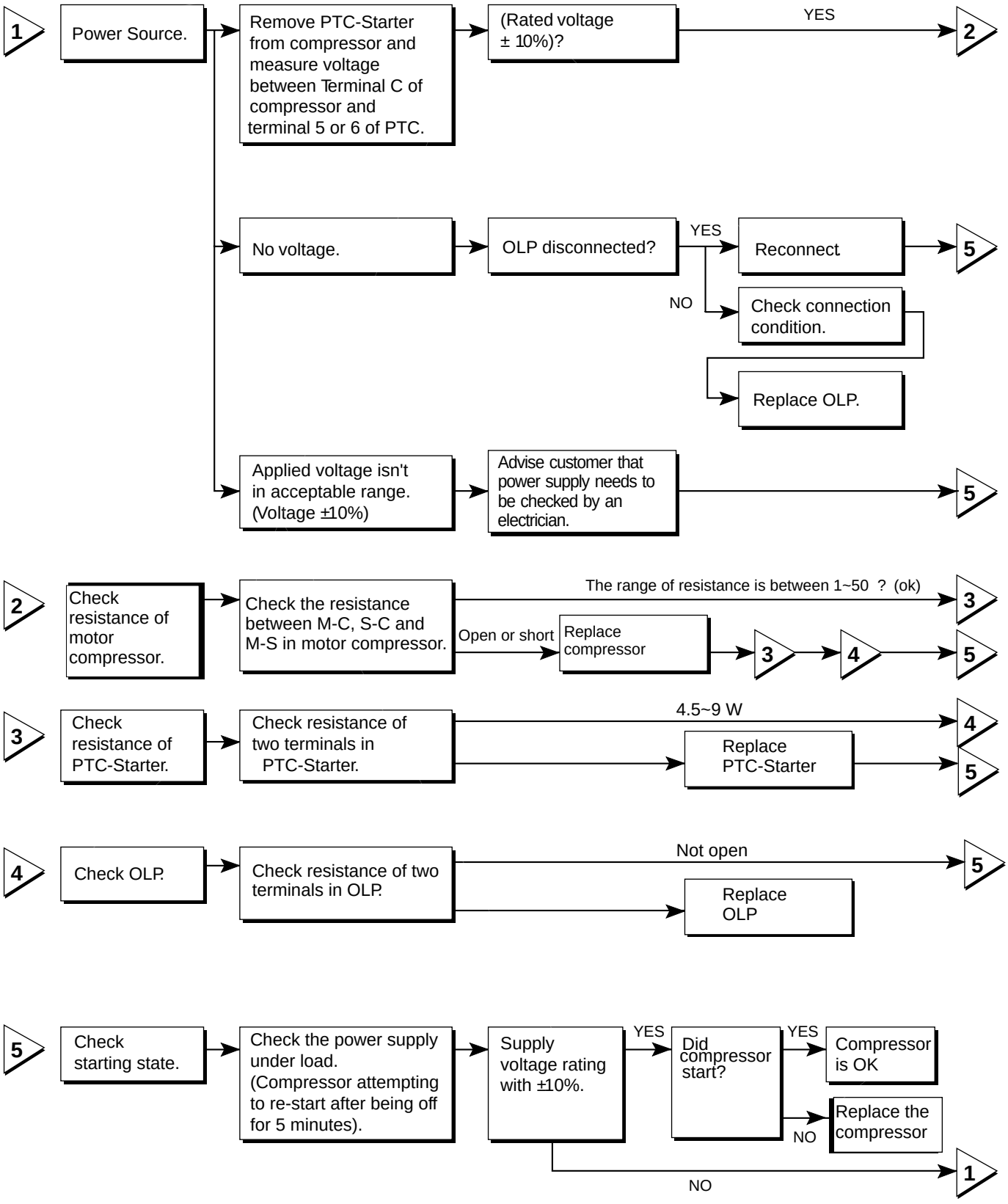


*PLUG TYPE, ICE MAKER PART, CAPACITOR PART, P.T.C START OPTION, DOOR HEATER, RT-SENSOR, DOOR S/W-R QTY. (1 OR 2), COMP' EARTH PART AND COMP' ACCESSORIES ON CIRCUIT DIAGRAM ARE SUBJECT TO CHANGE IN DIFFERENT LOCALITIES AND MODEL TYPE.

BK:BLACK	WH:WHITE	BN:BROWN	BO:BRIGHT ORANGE	SB:SKY BLUE	RD:RED
YL:YELLOW	PK:PINK	GN:GREEN	PR:PURPLE	GY:GREY	BL:BLUE

6. TROUBLESHOOTING

6-1 COMPRESSOR AND ELECTRIC COMPONENTS



6-2 PTC AND OLP

Normal operation of compressor is impossible or poor.

Separate PTC-Starter from Compressor and measure resistance between No. 5 and 6 of PTC-Starter with a Tester.
(Figure 1)

Observation value is 115V/60Hz : 6.8 ? ±20%

The resistance value is 0 ? (short) or 8 (open).

Replace PTC-Starter.

Separate OLP from compressor and check resistance value between two terminals of OLP whit a tester.
(Figure 2)

Shows continuity

Check another electric component.

Open

Replace OLP.

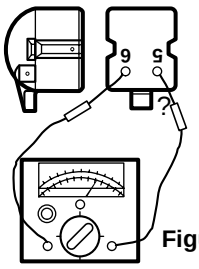


Figure 1

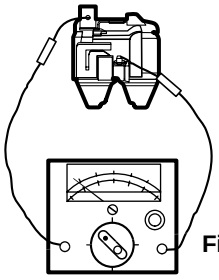
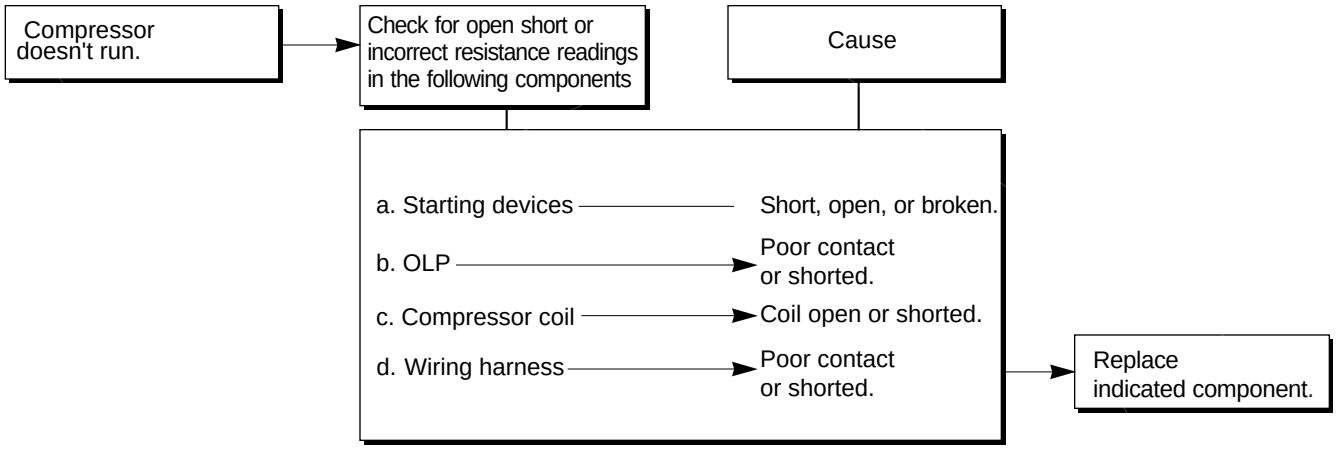


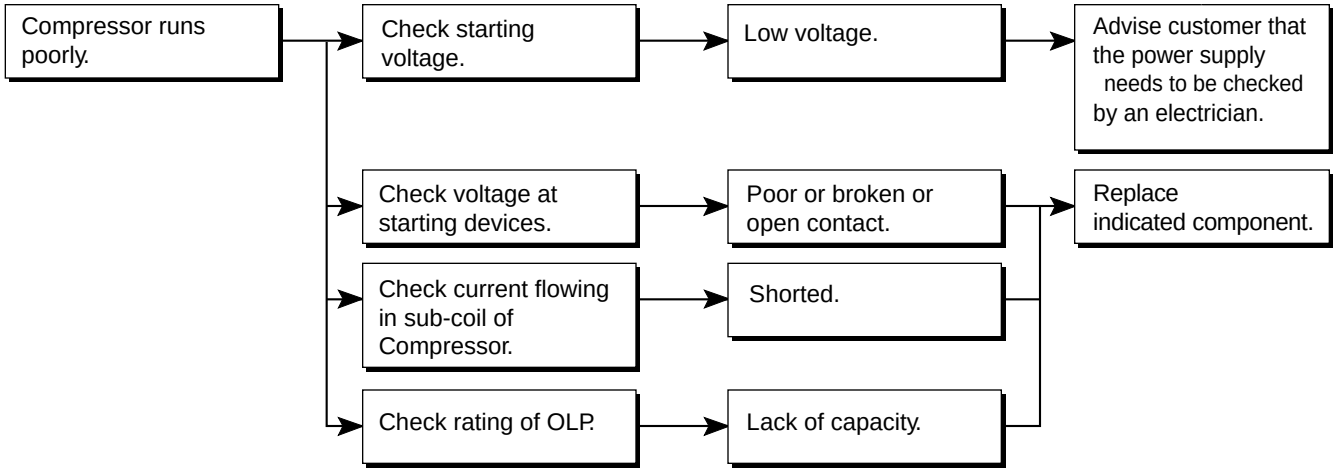
Figure 2

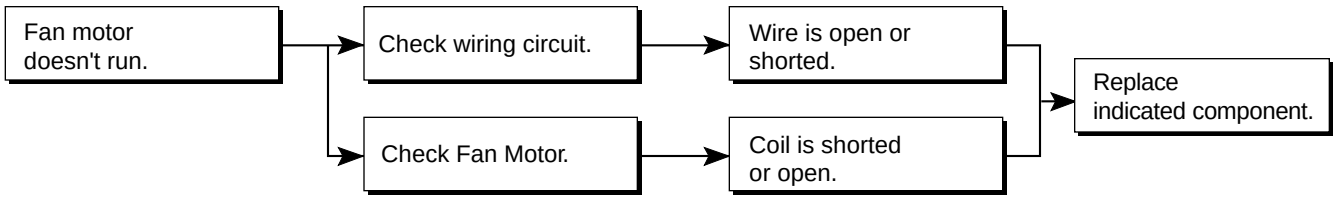
6-3 OTHER ELECTRICAL COMPONENTS

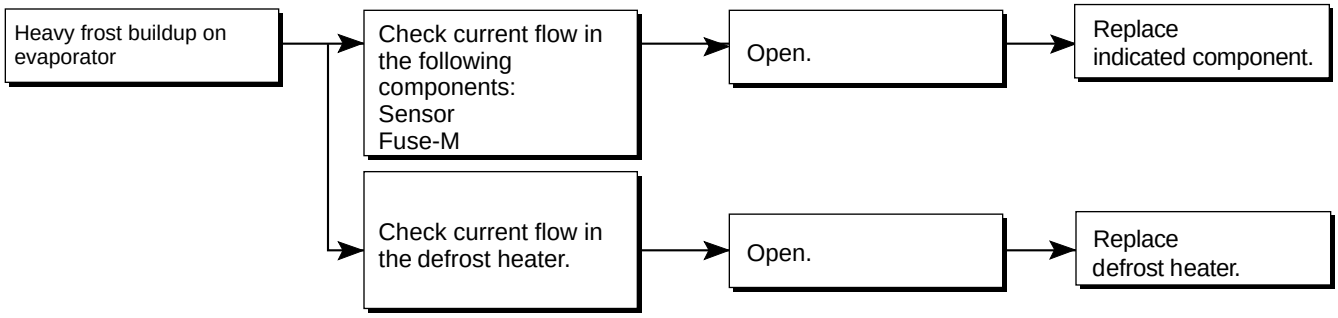
• Not cooling at all



• Poor cooling performance



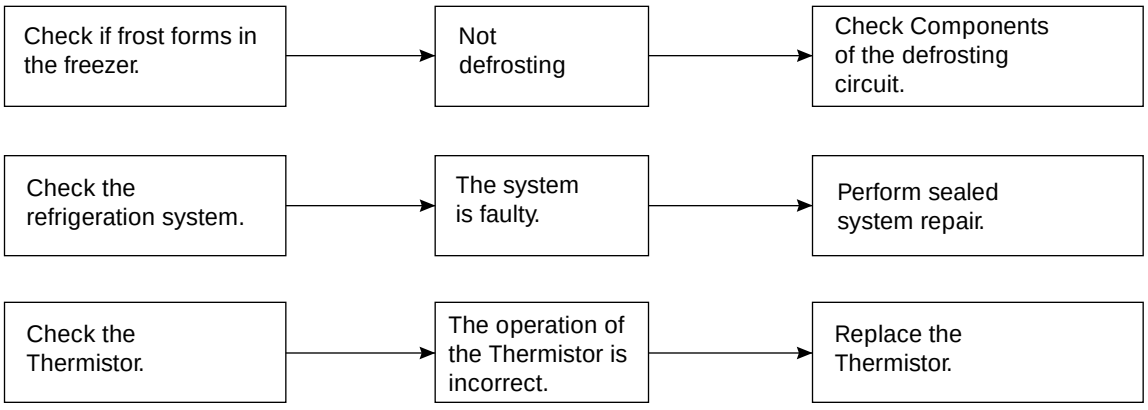




6-4 SERVICE DIAGNOSIS CHART

COMPLAINT	POINTS TO BE CHECKED	REMEDY
No Cooling.	• Is the power cord unplugged from the outlet? • Check if the power switch is set to OFF. • Check if the fuse of the power switch is shorted. • Measure the voltage of the power outlet.	• Plug into the outlet. • Set the switch to ON. • Replace the fuse. • If the voltage is low, correct the wiring.
Cools poorly.	• Check if the unit is placed too close to the wall. • Check if the unit is placed too close to the stove, gas cooker, or in direct sunlight. • Is the ambient temperature too high or the room door closed? • Check if food put in the refrigerator is hot. • Did you open the door of the unit too often or check if the door is sealed properly? • Check if the Control is set to **Warm position**.	• Place the unit about 4 inches (10 cm) from the wall. • Place the unit away from these heat sources. • Lower the ambient temperature. • Put in foods after they have cooled down. • Don't open the door too often and close it firmly. • Set the control to **Recommended position**.
Foods in the Refrigerator are frozen.	• Is food placed in the cooling air outlet? • Check if the control is set to **colder position**. • Is the ambient temperature below 41°F(5° C)?	• Place foods in the high-temperature section. (front part) • Set the control to **Recommended position**. • Set the control to **Warm position**.
Condensartion or ice forms inside the unit.	• Is liquid food sealed? • Check if food put in the refrigerator is hot. • Did you open the door of the unit too often or check if the door is sealed properly?	• Seal liquid foods with wrap. • Put in foods after they have cooled down. • Don't open the door too often and close it firmly.
Condensartion forms in the Exterior Case.	• Check if the ambient temperature and humidity of the surrounding air are high. • Is there a gap in the door gasket?	• Wipe moisture with a dry cloth. It will disappear in low temperature and humidity. • Fill up the gap.
There is abnormal noise.	• Is the unit positioned in a firm and even place? • Are any unnecessary objects placed in the back side of the unit? • Check if the Tray Drip is not firmly fixed. • Check if the cover of the compressor enclosure in the front lower side is taken out.	• Adjust the Leveling Screw, and position the refrigerator in a firm place. • Remove the objects. • Fix the Tray Drip firmly in the original position. • Place the cover in its original position.
Door does not close well.	• Check if the door gasket is dirty with an item like juice. • Is the refrigerator level? • Is there too much food in the refrigerator?	• Clean the door gasket. • Position in the firm place and level the Leveling Screw. • Make sure food stored in shelves does not prevent the door from closing.
Ice and foods smell unpleasant.	• Check if the inside of the unit is dirty. • Are foods with a strong odor unwrapped? • The unit smells of plastic.	• Clean the inside of the unit. • Wrap foods that have a strong odor. • New products smell of plastic, but this will go away after 1-2 weeks.

• Other possible problems:



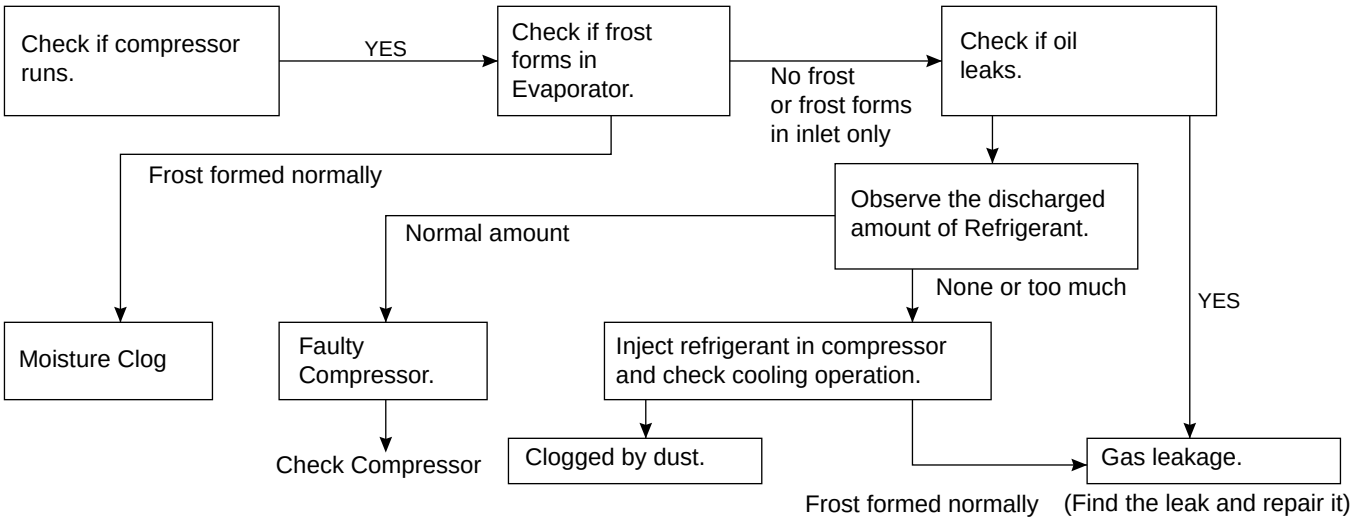
6-5 REFRIGERATION CYCLE

• Troubleshooting Chart

CAUSE		STATE OF THE UNIT	STATE OF THE EVAPORATOR	TEMPERATURE OF THE COMPRESSOR	REMARKS
LEAKAGE	PARTIAL LEAKAGE	Freezer compartment and refrigerator don't cool normally	Low flowing sound of refrigerant is heard and frost forms in inlet only.	A little higher than ambient temperature.	- Refrigerant level is low due to a leak. - Normal cooling is possible by restoring the normal amount of refrigerant and repairing the leak.
	COMPLETE LEAKAGE	Freezer compartment and refrigerator don't cool normally	Flowing sound of refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	- No discharging of refrigerant. - Normal cooling is possible by restoring the normal amount of refrigerant and repairing the leak.
CLOGGED BY DUST	PARTIAL CLOG	Freezer compartment and refrigerator don't cool normally	Flowing sound of refrigerant is heard and frost forms in inlet only.	A little higher than ambient temperature.	- Normal discharging of the refrigerant. - The capillary tube is faulty.
	WHOLE CLOG	Freezer compartment and refrigerator don't cool.	Flowing sound of refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	- Normal discharging of the refrigerant.
MOISTURE CLOG		Cooling operation stops periodically.	Flowing sound of refrigerant is not heard and frost melts.	Lower than ambient temperature.	- Cooling operation restarts when heating the inlet of the capillary tube.
DEFECTIVE COMPRESSION	COMPRE-SSION	Freezer and refrigerator don't cool.	Low flowing sound of refrigerant is heard and frost forms in inlet only.	A little higher than ambient temperature.	- Low pressure at high side of compressor due to low refrigerant level.
	NO COMPRE-SSION	No compressing operation.	Flowing sound of refrigerant is not heard and there is no frost.	Equal to ambient temperature	- No pressure in the high pressure part of the compressor.

Leakage Detection

Observe the discharging point of the refrigerant, which may be in the oil discharging part of the compressor and in a hole in the evaporator.



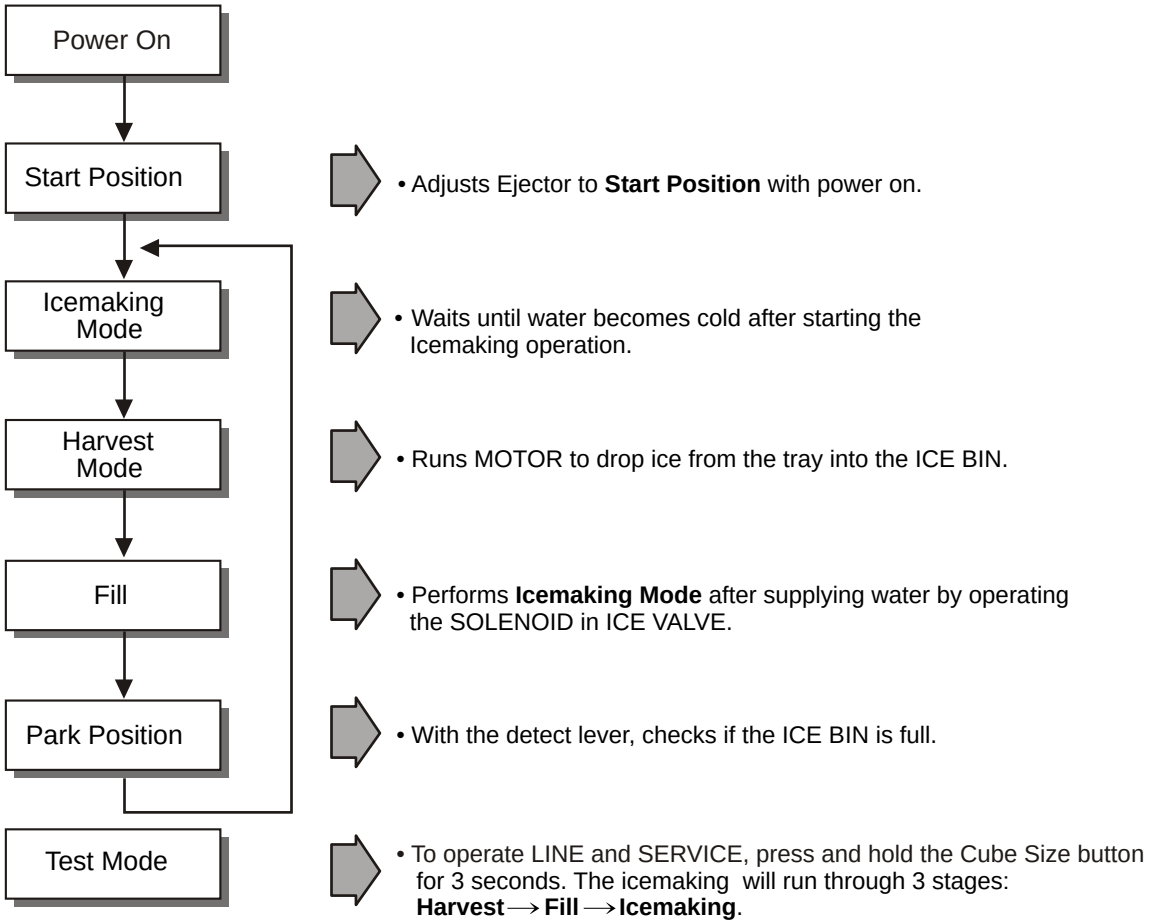
General Control of Refrigerating Cycle

NO.	ITEMS		UNIT	STANDARDS	PURPOSES	REMARKS
1	Pipe and piping system opening time		Min.	Pipe: within 1 hour. Comp: within 10 minutes. Drier: within 20 minutes.	To protect moisture penetration.	The opening time should be reduced to a half of the standards during rain and rainy seasons (the penetration of water into the pipe is dangerous).
2	Welding		Nitrogen pressure	Weld under Nitrogen atmosphere. (N_2 pressure: 0.1~0.2 kg/cm^2)	To protect oxide scale formation.	- Refer to repair note in each part. - R-134a refrigerant is more susceptible to leaks than R-12 and requires more care during welding. - Do not apply force to pipes before and after welding to protect pipe from cracking.
3	N_2 sealed parts		Confirm N_2 leak	Confirm the sound of pressure relief when removing the rubber cap. Sound: usable No sound: not usable	To protect moisture penetration.	- In case of evaporator parts, if it doesn't make sound when removing rubber cap, blow dry air or N_2 gas for more than 1 min. and than use the parts.
4	Refrige-ration Cycle	Evacuation time	Min.	More than 40 minutes	To remove moisture.	
		Vacuum degree	Torr	Below 0.03 (ref)		Note: Only applicable to the model equipped with reverse flow protect plate.
		Vacuum	EA	High and low pressure sides are evacuated at the same time for models above 200 l.		Vacuum efficiency can be improved by operating compressor during evacuation.
		Vacuum piping	EA	Use R-134a manifold exclusively.	To protect mixing of mineral and ester oils.	The rubber pipes for R-12 refrigerant will be melted when they are used for R-134a refrigerant (causes of leak.)
		Pipe coupler	EA	Use R-134a manifold exclusively.	To protect R-12 refrigerant mixing.	
		Outlet (Socket)		R-134a manifold exclusively.	To protect R-12 refrigerant mixing.	
		Plug		R-134a manifold exclusively.	To protect R-12 refrigerant mixing.	
5	Refrigerant weighing		EA	Use R-134a exclusively. Weighing allowance: 5g Note: Winter: -5g Summer: +5g	Do not mix with R-12 refrigerant.	- Do not weigh the refrigerant at too hot or too cold an area. (77°F [25°C] is adequate.) - Make Copper charging canister (Device filling refrigerant) Socket: 2SV Plug: 2PV R-134a Note: Do not burn O-ring (bushing) during welding.
6	Drier replacement			- Use R-134a exclusively for R-134a refrigerator. - Replace drier whenever repairing refrigerator cycle piping.	To remove the moisture from pipe inside.	
7	Leak check			- Do not use soapy water for check. It may be sucked into the pipe by a vacuum.	Defect in refrigerant leak area.	- Check for an oil leak at the refrigerant leak area. Use an electronic leak detector if an oil leak is not found. - The electronic leak detector is very sensitive to halogen gas in the air. It also can detect R-141b in urethane. Practice many times before using this type of detector to avoid false readings.

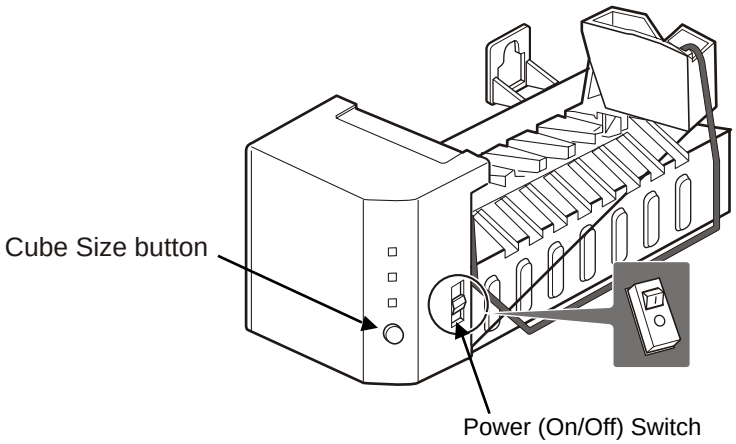
7. OPERATION PRINCIPLE AND REPAIR METHOD OF ICEMAKER

7-1 OPERATION PRINCIPLE

7-1-1 Operation Principle of Icemaker



1. Turning the Icemaker stop switch off (O) stops the icemaking function.
2. Setting the Icemaker switch to OFF and then turning it back on will reset the icemaker control.



7-2 ICE MAKER FUNCTIONS

7-2-1 Ice Making Mode

1. Icemaking refers to the freezing of supplied water in the ice trays. Complete freezing is assured by measuring the temperature of the Tray with icemaking SENSOR.
2. Icemaking starts after completion of the water fill operation.
3. The icemaking function is completed when the sensor reaches -7°C, 60 to 240 minutes after starting.

NOTE : After icemaker power is ON, the icemaker heater will be on for test for 9 sec.

7-2-2 Harvest Mode

1. Harvest (Ice removing) refers to the operation of dropping ices into the ice bin from the tray when icemaking has completed.
2. Harvest mode:
   (1) The Heater is ON for 30 seconds, then the motor starts.
   (2) Harvest mode is completed if it reaches start position again while Heater & Motor are on at the same time.
      A. ice bin is full : The EJECTOR stops (heater off).
      B. ice bin is not full : The EJECTOR rotates twice to open for ice.

NOTE : If the EJECTOR does not rotate once within 5 minutes in status (2), separate heater control mode starts operating to prevent the EJECTOR from being constrained. (It is recommended that the user open for ice to return to normal mode.)

7-2-3 Fill/Park Position

1. Once a normal harvest mode has been completed, the water solenoid will be activated.
2. The amount of water is adjusted by pressing the fill key repeatedly. This changes the time allowed for fill as illustrated in the table below.

Water supply amount table

STAGE	TIME TO SUPPLY	INDICATIONS	REMARKS
1	6 sec.		The water amount will vary depending on the water control switch setting, as well as the water pressure of the connected water line.
2	7 sec.		
3	8 sec.		

7-2-4 Function TEST

1. This is a compulsory operation for test, service, cleaning, etc. It is operated by pressing and holding the Cube Size button for 3 seconds.
2. The test works only in the Icemaking Mode. It cannot be entered from the Harvest or Fill mode. (If there is an ERROR, it can only be checked in the TEST mode.)
3. **Caution!** If the test is performed before water in the icemaker is frozen, the ejector will pass through the water. When the fill mode begins (Stage 4), unless the water supply has been shut off, added water will overflow into the ice bin. If the control Doesn't operate normally in the TEST mode, check and repair as needed.
4. After water is supplied, the normal CYCLE is followed: **icemaking ⇨ Harvest ⇨ Fill ⇨ Park Position**.
5. Five seconds after Stage 5 is completed, the icemaker returns to MICOM control. The time needed to supply water resets to the pre- test setting.

Diagnosis TABLE

STAGE	ITEMS	INDICATOR(*)	REMARKS
1	HEATER		Five seconds after heater starts, heater will go off if temperature recorded by sensor is 10°C (50°F)or lever is in up position.
2	MOTOR		Five seconds after heater starts, you can confirm that motor is moving.
3	HALL IC (TRAY)		You can confirm Hall IC detection of position.
4	SOLENOID VALVE		Two seconds after detection of initial position, you can confirm that valve is on.
5	HALL IC (LEVER)		You can check when the Hall IC is sensing a full ice condition. (If there is a water fill error, the fifth LED is not on.)
6	Reset	Return to Status prior to TEST MODE	Five seconds after fifth stage is completed, the icemaker resets to initial status.

7-3 DEFECT DIAGNOSIS FUNCTION

7-3-1 ERROR CODES shown on Ice Maker water supply control panel

NO	DIVISION	INDICATOR	PROBLEM	REMARKS
1	Normal	Note fill times (see previous page)	None	Display switch operates properly
2	Icemaking Sensor malfunction		Open or shorted wire or sensor	Make sure that the wire on each sensor is connected.
3	Icemaker Kit malfunction		Ejector blades have not reached the park position after 18 minutes from start of harvest mode	Check HALL IC/MOTOR/ HEATER/RELAY

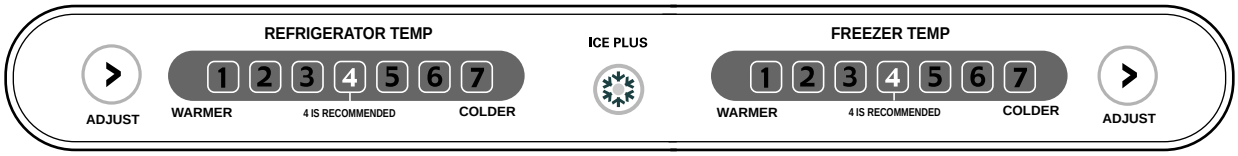
(*)ERROR indicators in table can be checked only in TEST mode.

8. DESCRIPTION OF FUNCTION & CIRCUIT OF MICOM

8-1 FUNCTION

8-1-1 Function

1. When the appliance is plugged in, it is set to “4” for Refrigerator and “4” for freezer.
   You can adjust the Refrigerator and the Freezer control temperature by pressing the ADJUST button,
2. When the power is initially applied or restored after a power failure, it is automatically set to “4” & “4”.



8-1-2 Control of freezer fan motor

1. Freezer fan motor has high and standard RPMs.
2. High RPM is used when electricity is first on, for ICE PLUS, and when refrigerator is overloaded.
   But standard RPM is used for general purposes.
3. To improve cooling speed and load corresponding speed, the RPM of freezer fan motor shall change from normal speed to high speed.
4. High speed (2500RPM): initial power on or load corresponding operation, ICE PLUS.
   Normal speed (2200 RPM): general working conditions.
5. Fan motor is stopped when Refrigerator Door is opened.
6. The fan motor is stopped when Freezer Door is opened (only if compressor status is OFF)

8-1-3 Ice Plus

1. The purpose of this funstion is to intensify the cooling speed of freezer and to increase the amount of ice.
2. Whenever selection switch is pressed, selection/release, the LED will turn ON or OFF.
3. If there is a power cut and the refrigerator is power on again, ICE PLUS function will be canceled.
4. To activate these function you need to press the ICE PLUS key and the LED will turn ON. This function will remain activated for 24 hrs. The first three hours the compressor and ICE PLUS will be ON. The next 21 hours the freezer will be controlled at the lowest temperature. After 24 hours or if the ICE PLUS key is pressed again, the freezer will return to its previous temperature.
5. For the first three hours notice the following cases:
   (1) Compressor and freezer fan (HIGH RPM) continuously operate for three hours.
   (2) If defrost starts during ICE PLUS, ICE PLUS operates for the rest of time after defrost is completed, when ICE PLUS operation time is less than 90 minutes.
   (3) If ICE PLUS is pressed during defrost, ICE PLUS LED is on but this function will start seven minutes after defrost is completed and it shall operate for three hours.
   (4) If ICE PLUS is selected within seven minutes after compressor has stopped, the compressor (compressor delays seven minutes) shall start after the balance of the delay time.
   (5) The fan motor in the freezer cmpartment rotates at high speed during ICE PLUS.

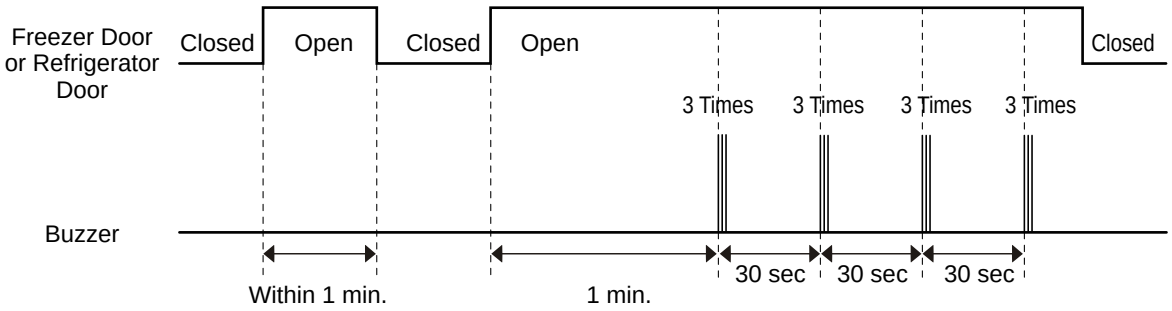
For the rest of 21 hours, the freezer will be controlled at the lowest temperature.

8-1-4 Refrigerator Lamp Auto OFF

To protect the risk of lamp heat, when Refrigerator door opens for 7 min., Refrigerator lamp is auto off.

8-1-5 Alarm for Open Door

1. This feature sounds a buzzer when the freezer or refrigerator door is not closed within 1 minute after it is opened.
2. One minute after the door is opened, the buzzer sounds three times each for ½ seconds. These tones repeat every 30 seconds.
3. The alarm is cancelled when the freezer or the refrigerator is closed while the buzzer sounds.



8-1-6 Buzzer Sound

When the button on the front Display is pushed, a Ding~ Dong~ sound is produced.

8-1-7 Defrosting (removing frost)

1. Defrosting starts each time the accumulated COMPRESSOR running time is between 7:30 and 40 hours. This time is determined by how often and how long the doors are opened.
2. For initial power on or for restoring power, defrosting starts when the compressor running time reaches 4 hours.
3. Defrosting stops if the sensor temperature reaches 46.4°F(8°C) or more. If the sensor doesn't reach 46.4°F(8°C) in 1 hours, the defrost mode is malfunctioning.
4. Defrosting won¸t function if its sensor is defective (wires are cut or short circuited)

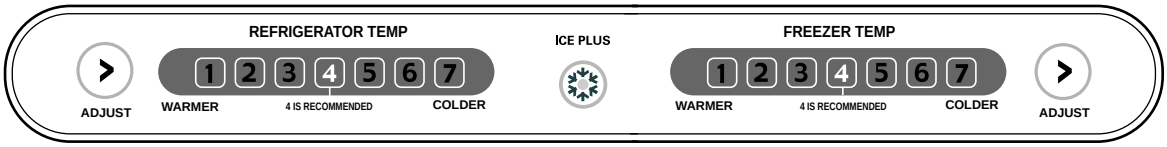
8-1-8 Electrical Parts Are Turned On Sequentially

Electrical parts such as COMP, defrosting heater, freezer FAN, etc. are turned on in the following order to prevent noise and parts damage. Several parts are started at the same time at initial power on and are turned off together when TEST is completed.

OPERATING		ORDERS
Initial power on	Temperature of Defrosting Sensor is 45°C or more (when unit is newly purchased or when moved)	**POWER ON** → (In ½ second) **COMP ON** → (In ½ second) **Freezer FAN ON** → (In ½ second) **Cooling FAN ON**
	Temperature of defrosting sensor is lower than 45°C (when power cuts, SERVICE)	**POWER ON** → (In ½ second) **Defrosting heater ON** → (In 10 second) **Defrosting heater OFF** → (In ½ second) **COMP ON** → (In ½ second) **Freezer FAN ON** → (In ½ second) **Cooling FAN ON**
Reset to normal operation from TEST MODE		**Total Load OFF** → (In 7 minute) **COMP ON** → (In ½ second) **Freezer FAN ON** → (In ½ second) **Cooling FAN ON**

8-1-9 Defect Diagnosis Function

1. Automatic diagnosis makes servicing the refrigerator easy.
2. When a defect occurs, the buttons will not operate; but the tones. such as ding. will sound.
3. When defect is repaired the defect code is removed and refrigerator returns to normal operation (RESET)
4. The Defect code is shown on the Display.



ERROR CODE on display panel ● LED OFF LED ON ◎

NO	ITEM	ERROR CODE		CONTENTS	REMARKS
1	Failure of freezer sensor	All off	● ◎ ◎ ◎ ◎ ◎ ◎	Cut or short circuit wire	Inspect Connecting wires on each sensor
2	Failure of Refrigerator sensor	All off	◎ ● ◎ ◎ ◎ ◎ ◎	Cut or short circuit wire	
3	Failure of defrost sensor	All off	◎ ◎ ● ◎ ◎ ◎ ◎	Cut or short circuit wire	
4	Poor of defrost	All off	● ● ● ● ◎ ◎ ◎	1 hours later after starting defrost, If sensor doesn't be over 46ºF (8ºC)	Snapping of defrost heater or Temperature fuse, pull-out of Connector (indicated minimum 1 Hours after failure occurs)
5	Failure of BLDC fan motor at freezing compartment	All off	● ● ● ● ● ◎ ◎	If there is no fan motor signal for more than 115sec in operation	Poor motor, hocking to wires of fan, contact of structures to fan, snapping or short of lead

8-1-10 TEST Mode

1. The Test mode allows checking the PCB and the function of the product as well as finding out the defective part in case of an error.
2. The test mode is operated by pressing two buttons at Display panel.
3. While in the test mode, the function control button is not recognized, but the recognition tone (beep~) sounds.
4. After exiting the test mode, be sure to reset by unplugging and then plugging in the appliance.
5. If an error, such as a sensor failure, is detected in the test mode, the test mode is cleared and the error code is displayed.
6. While an error code is displayed, the test mode will not be activated.

MODE	MANIPULATION	CONTENTS	REMARKS
TEST1	Push ICEPLUS key and ADJUST key of Freezer temperature at the same time over 3 seconds. Or press TEST S/W one time in the Main PCB board.	1.-Continuous operation of the COMPRESSOR 2.Continuous operation of the freezer fan 3.Stepping DAMPER OPEN 4.Defrosting Heater OFF 5.Every DISPLAY LED ON	Reset after 5 minutes
TEST2	Push ICEPLUS key and ADJUST key of Freezer temperature at the same time over 3 seconds being in TEST MODE1. Or press TEST S/W one time being in TEST MODE 1.	1.COMP OFF 2.Freezer FAN OFF 3.Stepping DAMPER CLOSE 4.Defrosting Heater ON 5.DISPLAY LED 1,3,5,7 ON	Reset if the temperature of the defrosting sensor is 46°F (8°C) or more
Reset	Push ICEPLUS key and ADJUST key of Freezer temperature at the same time over 3 seconds being in TEST MODE2. Or press TEST S/W one time being in TEST MODE 2.	Reset to the previously setting before TEST MODE	The Compressor will start after a 7-minute Delay

NOTE : LED CHECK MODE: When the refrigerator temperature control and the freezer temperature control button at the same time are hold for 1 second or longer, every LED on the display turns on at the same time. when the button are relesed, the previous mode is restored.

* Freezer Fan RPM Variable Check:

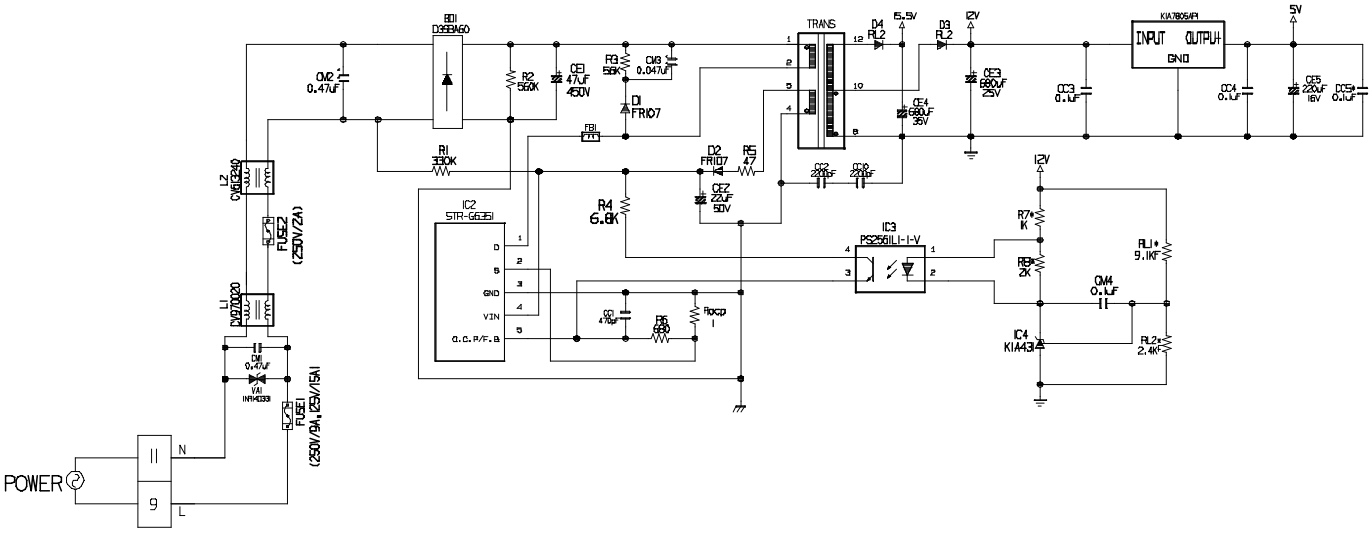
In case the freezer fan is in operation when the ADJUST key in Refrigerator and Freezer Temp. Control are pressed for more than one second at the same time freezer fan RPM changes. (For example if high speed, to normal speed or if normal speed, to high speed for 30 seconds)
After 30 seconds, it turns to its original RPM.

*Demonstration MODE;

1. When the ICE PLUS key and ADJUST key of refrigerator temperature control are pressed for more than 3 seconds at the same time temperature´s it converts to demonstration mode.
2. In this status, each LED is rotated with 1 second interval.
3. In this status, all loads are off (Compressor / Fan / Damper / Heater)
   (Even is Demonstration Mode, the refrigerator Lamp automatic off function works normally and can be demonstrated)
4. It reset if you do again as clause.

8-2 PCB FUNCTION

8-2-1 Power Circuit



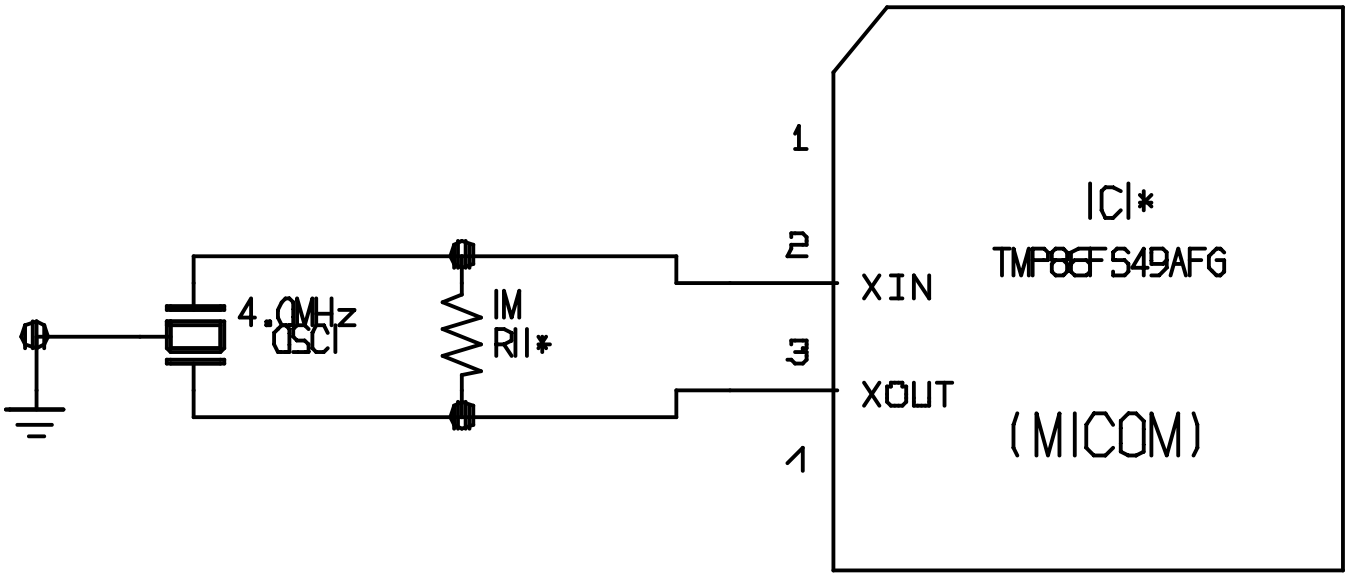
The secondary part of the TRANSFORMER is composed of the power supply for the display, the BLDC FAN Motor drive (15.5 V), the relay drive (12 Vdc) and the MICOM and IC (5 Vdc).

The voltage for each part is as follows:

PART	VA 1	CE 3	CE 4	CE 5
VOLTAGE	115 Vac	12 Vdc	15.5 Vdc	5 V

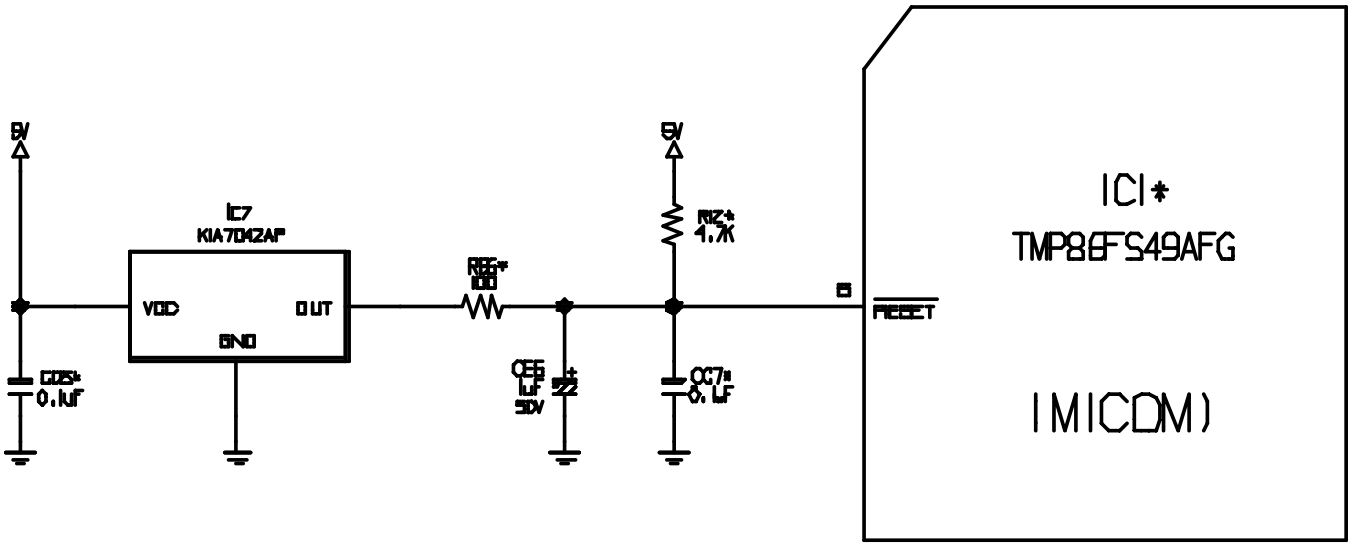
VA1 is a part for preventing over voltage and noise. When 385V or higher power is applied, the inside elements are short-circuited and broken, resulting in blowout of the fuse in order to protect the elements of the secondary part of the TRANSFORMER.

8-2-2 Oscillation Circuit



This circuit generates the base clock for calculating time and the synchro clock for transmitting data from and to the inside logic elements of the IC1 (MICOM). Be sure to use specific replacement parts, since calculating time by the IC1 may be changed. If changed, the OSC1 SPEC will not work.

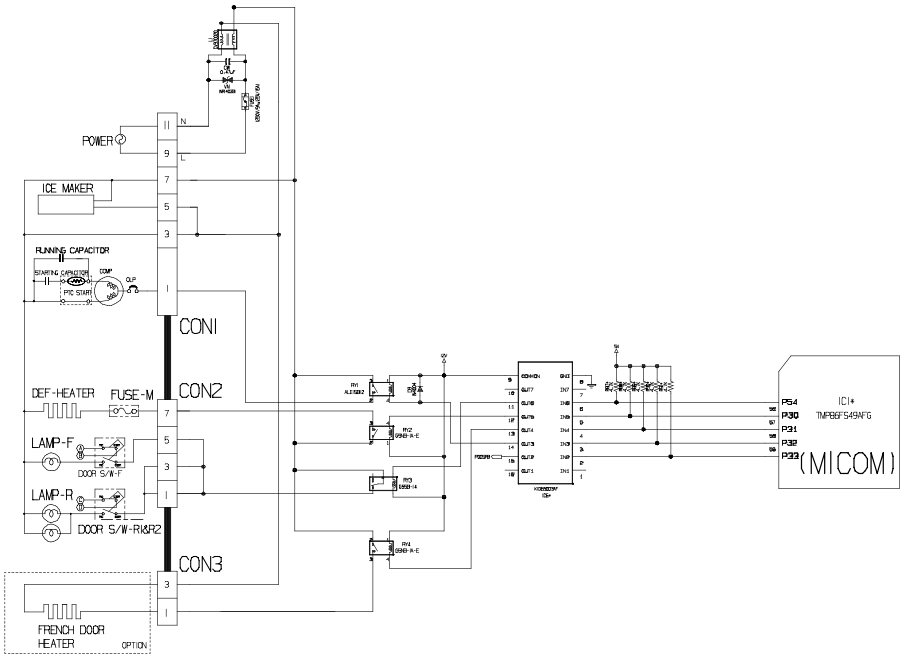
8-2-3 Reset Circuit



The RESET circuit allows all the functions to start at the initial conditions by initializing various parts, including the RAM inside the MICOM (IC1) when the power is initially supplied or the power supply to the MICOM is restored after a momentary power failure. For the initial 10ms of power supply, LOW voltage is applied to the MICOM RESET terminal. During a normal operation, 5V is applied to the RESET terminal. (If a malfunction occurs in the RESET IC, the MICOM will not operate.)

8-2-4 Load / Buzzer Drive & Open Door Detection Circuit

1. Load Drive Condition Check

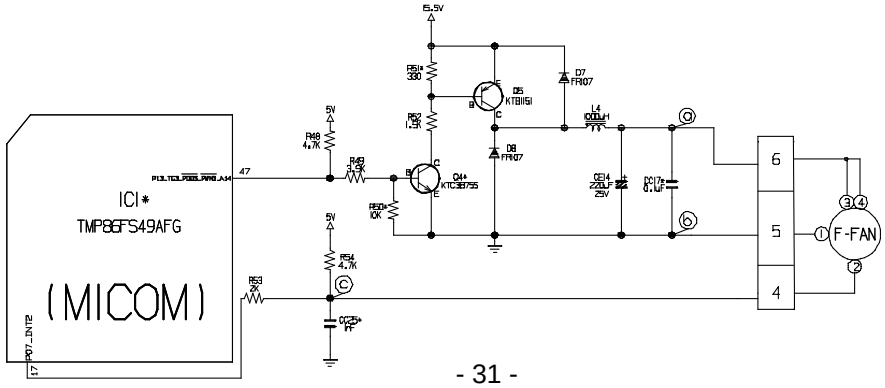


LOAD TYPE		COMP	DEFROSTING HEATER	LAMP	TCM POWER MODE (OPTIONAL)
Measurement Location (IC6)		NO.14	NO.12	NO.11	NO.12
Condition	ON	1V or below			
	OFF	12V			

2. Fan motor driving circuit (freezing compartment fan)

1. This circuit makes standby power **0** by cutting off power supplied to ISs inside of the fan motor in the fan motor OFF.
2. This is a circuit to perform a temporary change of speed for the fan motor and applies DC voltage up to 7.5V ~ 16V to motor
3. This circuit prevents over-driving the fan motor by cutting off power applied to the fan motor in the lock of fan motor by sensing the operation RPM of the fan motor.

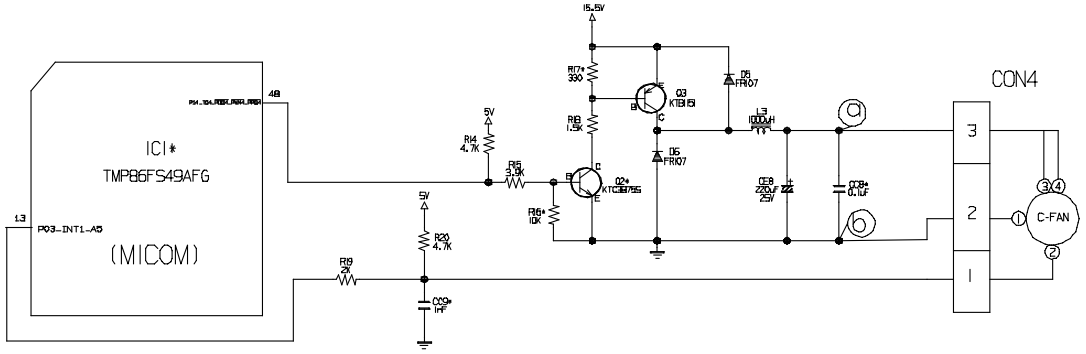
	ⓐ part	ⓑ part	ⓒ part
MOTOR OFF	2V or less	0V	5V
MOTOR ON	13V~15V	0V	2V~3V



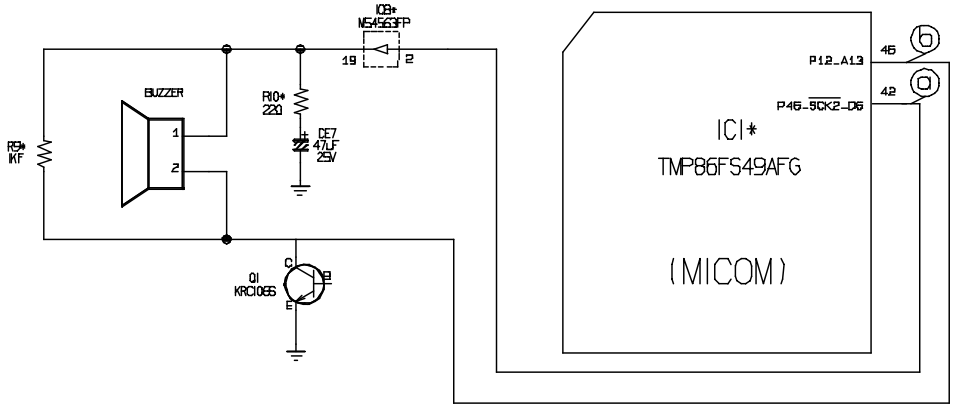
3. Cooling motor driving circuit (machine room)

1. This circuit makes standby power 0 by cutting off power supplied to Iss inside of the fan motor in the fan motor OFF.
2. This circuir prevents over-driving the fan motor by cutting off power applied to the fan motor in the lock of fan motor by sensing the operation RPM of the fan motor.

	ⓐ Part	ⓑ Part
MOTOR OFF	2V or less	0V
MOTOR ON	13V - 15V	0V

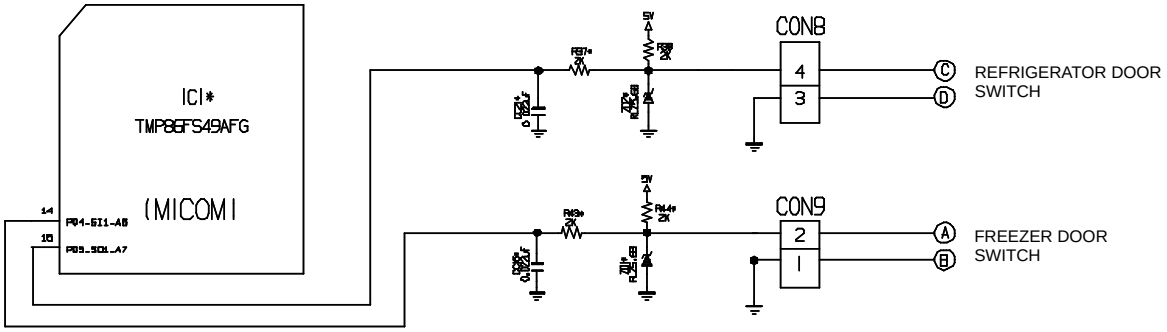


4. Buzzer Drive Condition Check



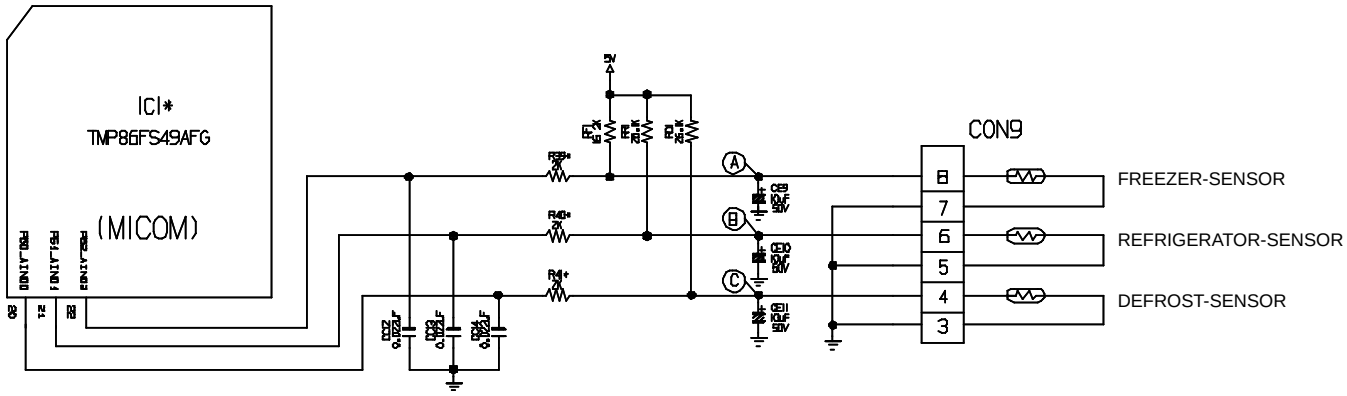
Condition / Measure-ment Location	Tone (Ding~Dong~) when the button on the display is pushed.	Alarm for open door (beep-beep-beep)	OFF
IC1 (Ⓐ)	0.05 s, 0.2 s, 0.1 s, 2 s; 5 V / 0 V	0.5 s, 0.5 s; 5 V / 0 V	**0 V**
IC1 (Ⓑ)	5 V / 0 V; 2.63 kz (Ding~), 2.21 kz (Dong~)	5 V / 0 V; 2.63 kz(Beep~), OFF	**0 V**

5. Open Door Detection Circuit Check



Measurement Location / Freezer/ Refrigerator Door	(PIN NO.15 & PIN NO.14)
Closed	**5 V**
Open	**0 V**

8-2-5 Temperature Sensor Circuit

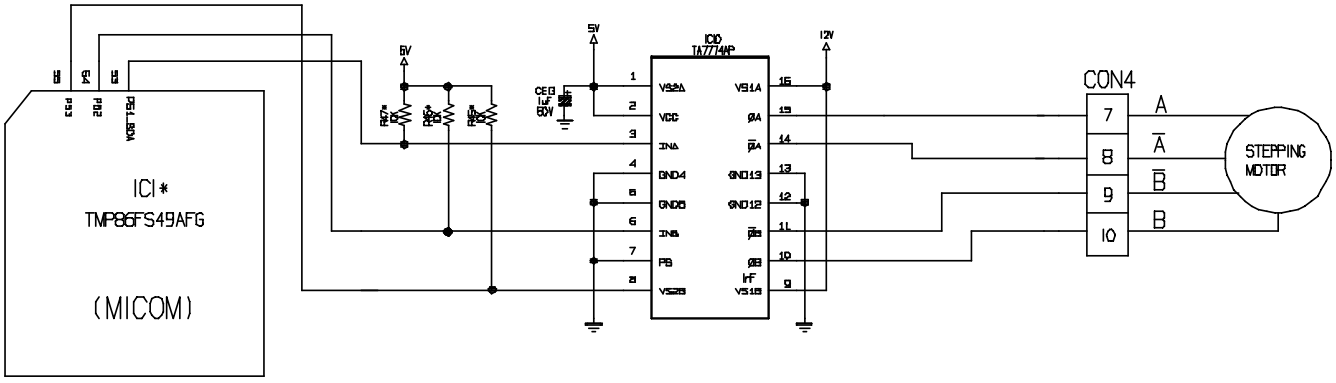


The upper CIRCUIT reads REFRIGERATOR temperature, FREEZER Temperature, and DEFROST-SENSOR temperature for defrosting and the indoor temperature for compensating for the surrounding temperature into MICOM.
OPENING or SHORT state of each TEMPERATURE SENSOR are as follows:

SENSOR	CHECK POINT	NORMAL (-30°C ~ 50°C)	SHORT-CIRCUITED	OPEN
Freezer Sensor	POINT Ⓐ Voltage	0.5 V ~ 4.5 V	0 V	5 V
Refrigerator Sensor	POINT Ⓑ Voltage			
Defrosting Sensor	POINT Ⓒ Voltage			

8-2-6 Refrigeration Compartment Stepping Motor Damper Circuit

* The circuit shown below is the damper circuit to regulate the refrigerator temperature.



8-2-7 Temperature Compensation & Overcooling/Undercooling Compensation Circuit

1. Refrigerator Temperature Compensation

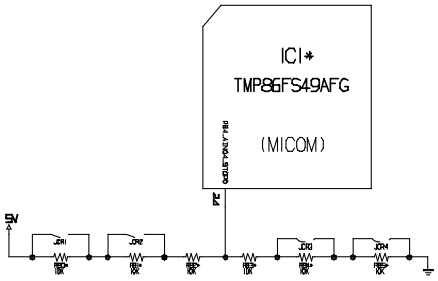
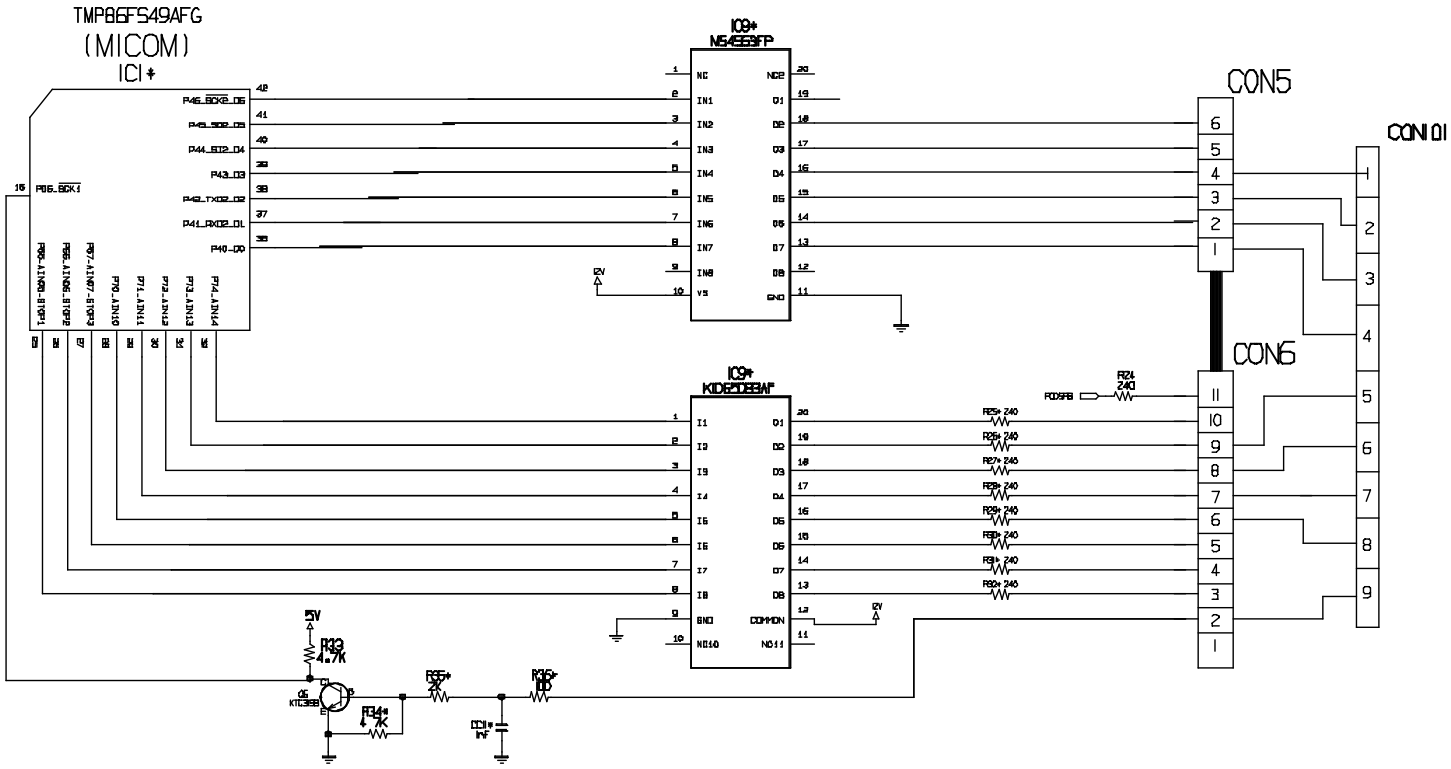


Table of Refrigerator temperature compensation.

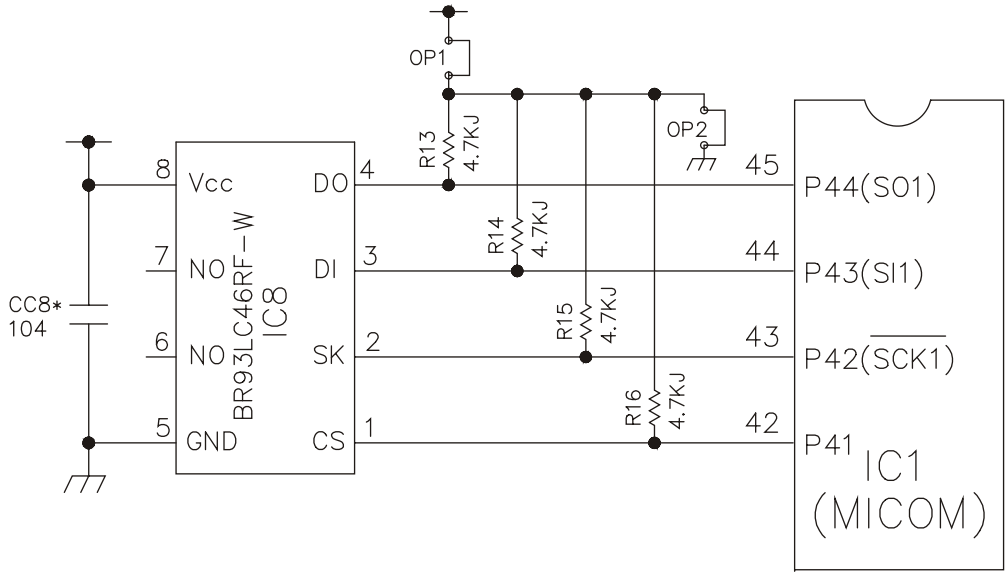
OPTION	CUTTING	REMARK
JCR1	R+ 1.0 deg compensation	Warmer
JCR2	R+ 1.0 deg compensation	
JCR3	R- 1.0 deg compensation	Colder
JCR4	R- 1.0 deg compensation	

8-2-8 Key Button Input & Display Light-On Circuit

? The circuit shown above determines whether a function control key on the operation display is pushed. It also turns on the corresponding function indication LED (LED Module) SEVEN SEGMENT DISPLAY (SEVEN SEGMENT DISPLAY MODULE). The drive type is the scan type



8-2-9 Power Failure Compensation Circuit (DISPENSER MODEL)



8-3 RESISTANCE SPECIFICATION OF SENSOR

TEMPERATURE DETECTED BY SENSOR	RESISTANCE OF FREEZER SENSOR	RESISTANCE OF REFRIGERATOR & DEFROST SENSOR & ROOM SENSOR
-20°C	22.3KΩ	77KΩ
-15°C	16.9KΩ	60KΩ
-10°C	13.0KΩ	47.3KΩ
-5°C	10.1KΩ	38.4KΩ
0°C	7.8KΩ	30KΩ
+5°C	6.2KΩ	24.1KΩ
+10°C	4.9KΩ	19.5KΩ
+15°C	3.9KΩ	15.9KΩ
+20°C	3.1KΩ	13KΩ
+25°C	2.5KΩ	11KΩ
+30°C	2.0KΩ	8.9KΩ
+40°C	1.4KΩ	6.2KΩ
+50°C	0.8KΩ	4.3KΩ

- The resistance of the SENSOR has a ±5% common diference.
- Measure the resistance of the SENSOR after leaving it for over 3 minutes in the measuring temperature. This delay is necessary due to sensor response speed.

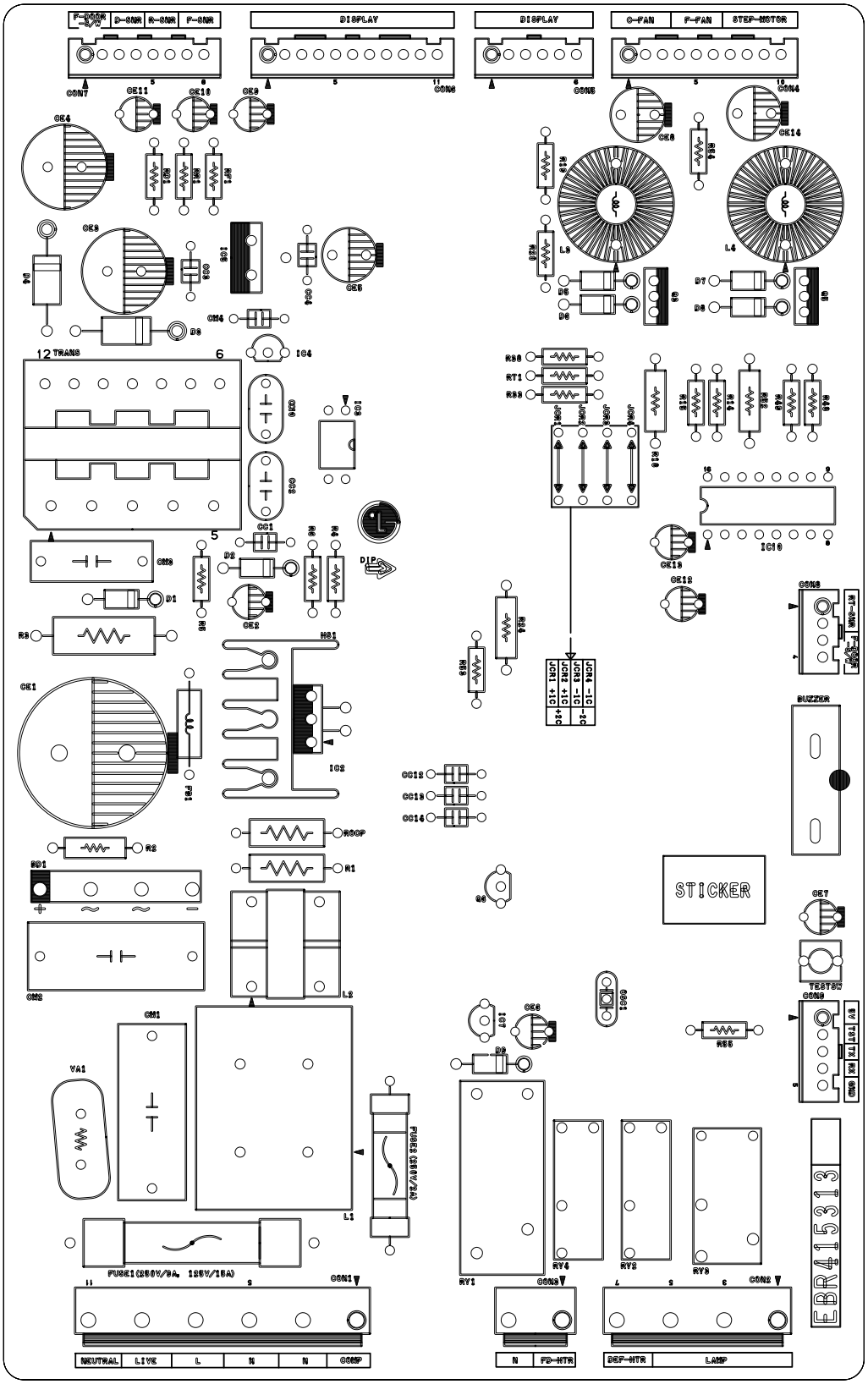
8-4 TROUBLESHOOTING

PROBLEM	INDICATED BY	CHECK	CHECKING METHOD	CAUSE	SOLUTION
POWER SOURCE is poor.	1. The whole DISPLAY LED/SEVEN SEGMENT DISPLAYis off. 2. DISPLAY LED/ SEVEN SEGMENT DISPLAY operates abnormally	1. FREEZER/ REFRIGERATOR.	Check if FREEZER/ REFRIGERATOR DOOR IS OPEN and check display.	POWER SOURCE is poor.	Check outlet Voltage.
		2. If LAMP is dim.	Check visually.	Applied voltage error.	Use boosting TRANS.
		3. The connection of the MAIN PWB CONNECTOR.	Check connection of CONNECTOR.	CONNECTOR connection is poor.	Reconnect CONNECTOR.
				TRANS FUSE is open.	Replace TRANS.
COOLING is poor.	NO COOLING.	1. If the COMPRESSOR operate.	USE TEST MODE1 (forced COOLING). If less than 7 minutes pass after compressor shuts off, don't press the KEY and wait.	COMPRESSOR locked or blocked.	Replace COMPRESSOR.
				OLP, PTC is poor. COMPRESSOR RELAY is poor.	Replace OLP, PTC. Replace MAIN PWB.
				THE CONNECTING WIRE is poor.	Check the connection of the black wire of the MAIN PWB CONNECTOR (CON2).
		2. If refrigerant is leaking.	Measure the amount of frost sticking on EVAPORATOR and the surface temperature of the condenser pipe.	Refrigerant leakage.	Replace the leaking part and replace any lost refrigerant.
	FREEZER TEMPERATURE is incorrect	1. If FANMOTOR operates.	USE TEST MODE1 (forced COOLING).	FAN MOTOR is poor.	Replace the FAN MOTOR.
				CONNECTING WIRE is poor.	Refer to 8-2-4. 2 and check
		2. If DEFROSTING is normal.	Check the amount of frost sticking on the EVAPORATOR .	DEFROSTING is poor.	See **DEFROSTING is poor**.
		3. If SENSOR is normal.	Check the resistance of the Refrigerator SENSOR.	SENSOR RESISTANCE is poor.	Replace SENSOR.
		4. Door Line contact.	Check the seal when the door is closed.	Door liner damaged.	Replace door liner.

PROBLEM	INDICATED BY	CHECK	CHECKING METHOD	CAUSE	SOLUTION
COOLING is poor.	If REFRIGERATOR TEMPERATURE is too low.	1.If FREEZER TEMPERATURE isn ormal.	Check is FREEZER TEMPERATURE is too low.		Make sure the DOOR isattached.
		2. If amount of cool air from FAN MOTOR is sufficient.	Make sure that the amount and speed of cool air are sufficient by touching the check supplied on the REFRIGERATOR.	FAN MOTOR is poor.	Replace FAN MOTOR.
				Passage of cool air is blocked.	Remove impurities.
				EVA frozen.	See **DEFROSTING is poor**.
		3. Door Line contact.	Check door seal when door is closed.	Door liner damaged.	Replace Door liner.
DEFROSTING is poor.	NO DEFROSTING.	1. If HEATER emits heat.	USE TEST MODE3 (forced DEFROSTING).	HEATER disconnection.	Replace HEATER.
				TEMPERATURE FUSE disconnection.	Replace TEMPERATURE FUSE.
				Connection is poor.	Check EVAPORATOR connection and wire of MAIN PWB CONNECTOR.
				DEFROST-SENSOR is poor.	Replace DEFROST-SENSOR.
				HEATER RELAY is poor.	Replace RY2 of MAIN PWB.
		2. If DRAIN PIPE is blocked.	Check DRAIN PIPE.	DRAIN PIPE is blocked.	Remove ice and impurities.
					Check HEATER PLATE resistance.
		3. If ice remains after DEFROSTING.	Make sure that DEFROST SENSOR is connected.	Connection is poor.	Reassemble the DEFROST-SENSOR.
			Make sure that FREEZER / REFRIGERATOR DOOR is closed.	DOOR does not close properly.	Reassemble DOOR.
					Replace GASKET.

8-5 MAIN PWB ASSEMBLY AND PARTS LIST

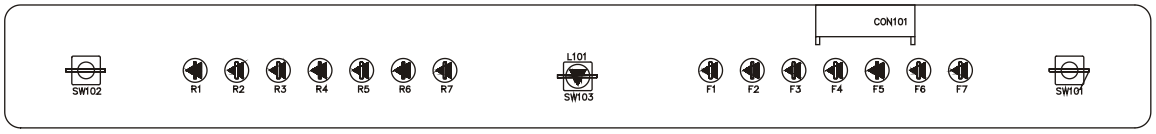
8-5-1 Main PWB Assembly



8-5-2 Replacement Parts List

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	EAX41531201	PWB(PCB)	BRAVO30 PJT, 2BLDC VER. 2	DOO SAN	T:1.6
2					
3	6170JB2012A	TRANSFORMER,SMPS(COIL)	DL-PJT 2.9MH/20W	SAM IL,SMC	TRANS
4	6170JB2012B	TRANSFORMER,SMPS(COIL)	GR-207,BLDC 100V-127V	SAM IL,SMC	
	6170JB2012C				
5					
6	EAF36838801	PROTECT DEVICE,FUSE	62NR GLASS 250V 9A KS AXIAL BK	ORISEL	FUSE1
7	EAF36838802	PROTECT DEVICE,FUSE	62NR GLASS 250V 15A KS AXIAL BK	ORISEL	
8	OFZZJB300IA	PROTECT DEVICE,FUSE	250V T2A 52S020H(SLOW-BLOW) LITTELFUSE TRIAD	ORISEL	FUSE2
9					
10	6630WI0111	CONNECTOR (CIRC),WAFER	YW396 YEONHO 11P 3.96MM YW396-11AV (11P-2,4,6,8,10)	YEON HO	CON1
11	6630A09106C	CONNECTOR (CIRC),WAFER	YW396-07AV YEONHO 7PIN 3.96MM STRAIGHT SN	YEON HO	CON2
12	6630A09106A	CONNECTOR (CIRC),WAFER	YW396-03AV 3P 3.96MM IR STRAIGHT	YEON HO	CON3
13	6630JB8004J	CONNECTOR (CIRC),WAFER	SMW250-10P 10P 2.50MM IR STRAIGHT	YEON HO	CON4
14	6630JB8004E	CONNECTOR (CIRC),WAFER	SMW250-06P 6P 2.50MM IR STRAIGHT	YEON HO	CON5
15	6630JB8004K	CONNECTOR (CIRC),WAFER	SMW250-11P 11P 2.50MM IR STRAIGHT	YEON HO	CON6
16	6630JB8004G	CONNECTOR (CIRC),WAFER	SMW250-08P 8P 2.50MM IR STRAIGHT	YEON HO	CON7
17	6630JB8004C	CONNECTOR (CIRC),WAFER	SMW250-04P 4P 2.50MM IR STRAIGHT	YEON HO	CON8
18	6630JB8004D	CONNECTOR (CIRC),WAFER	SMW250-05P 5P 2.50MM IR STRAIGHT	YEON HO	CON9
19					
20	6102W5V007A	VARISTOR	INR14D331K 330V 10% UL/CSA/VDE BK ILJIN	IL JIN	VA1
			SVC331D-14A	SAMWHA	
			TVR14331	THINKING	
21	6102JB800IB	VARISTOR	SVC621D-14A SAMWHA UL/VDE BK 620V	SAMWHA, IL JIN	
22	6920000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING,1POLE	MATSUSHITA	RY1
	6920JB2005B		G5JS-1A-NT-12VDC AC250V DC12V 16A 1A UL/CSA/VDE LEAD	OMRON	
	6920JB2005C		OMIH-SS-112LM DEG AC240V DC12V 16A 1A UL/CSA/VDE/SEMKO DIP DEG	DEC	
	EBB35235101		OMIH-SS-112LM DEG AC240V DC12V 16A 1A UL/CSA/VDE/SEMKO DIP DEG	TYCO	
23	6920JB2003H	RELAY	G5NB-1A-E 5VDC AC250V DC5V 5A 1A UL/CSA/VDE 20.5*7.2*15.3 DIP	OMRON	RY2,RY4
	6920JB2003D		G5NB-1A-E-12VDC(JPN) AC250V/DC30V DC12V 5A 1A UL/CSA/VDE	OMRON	
	6920JB2003E		G5NB-1A-E-12VDC(CHN) AC250V/DC30V DC12V 5A 1A UL/CSA/VDE	OMRON	
24	6920JB2009B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC IC NO VENTING,1POLE	OMRON	RY3
25	6212BA3041A	OSCILLATOR,RESONATOR,CERAMIC	CSTLS4M00G53-A0 MURATA 4MHZ +/-0.5% TA 15PF	MURATA	OSC1
26					
27	EAN44005901	IC,MICROCONTROLLERS	TMP86FS49AFG TOSHIBA 64P BULK FLASH BRAVO30 ENERGY STAR '08	TOSHIBA	IC1
28	EAN44005902	IC,MICROCONTROLLERS	TMP86FS49AFG TOSHIBA 64P BULK FLASH BRAVO33 BETTER ENERGY STAR '08	TOSHIBA	
29	EAN44005903	IC,MICROCONTROLLERS	TMP86FS49AFG TOSHIBA 64P BULK FLASH WINNER2 GOOD/BETTER ENERGY STAR '08	TOSHIBA	
30	EAN44005904	IC,MICROCONTROLLERS	TMP86FS49AFG TOSHIBA 64P BULK FLASH WINNER2 BEST ENERGY STAR '08	TOSHIBA	
31	EAN44005905	IC,MICROCONTROLLERS	TMP86FS49AFG TOSHIBA 64P BULK FLASH BRAVO33 BASIC	TOSHIBA	
32					
33	0IPMG5K001A	IC,HIC	STR-G6351 15.8TO19.4V 9.1TO11.1V SWITCHING REGULATOR ZIP ST 5P	SANKEN	IC2
34	0IPMGNE001A	PHOTO_COUPLER	PS2561L1-1-V NEC 4P,DIP BK : TLP721F	NEC	IC3
35	0IKE43I000A	IC,VOLTAGE REGULATOR	KIA431 36V 36V 700MW TO92 TP 3P	KEC	IC4
36	0IKE78D50DW	IC,VOLTAGE REGULATOR	KIA7805API 7TO20V 5V 2W TO220IS ST 3P	KEC	IC5
37	0IKEE650030C	IC,LED DRIVER	KIDE5003AF 16 SOP BK 7CH DRIVE	KEC	IC6
38	0IKE704200A	IC,VOLTAGE DETECTOR	KIA7042P -0.3TO15V 4.2V 400MW TO92 TP RESET 3P	KEC	IC7
39	0ISTLMI001A	IC,LOGIC IC	M54563FP MITSUBISHI 20 R/TP CONVERT	MITSUBISHI	IC8
40	0IKE650B303B	IC,LED DRIVER	KIDE5083AF -0.5TO30V -0.5TO50V 350MW DIP ST 20P	KEC	IC9
	EAN34119001		ULN2803AF 0V TO 30V -0.5V TO 30V 480MW SOL R/TP 18P	TOSHIBA	
41	0IT0777400A	IC,MOTOR DRIVER	TA7774AP 16,SDIP BK DRIVE,IC STEPPING MOTOR	TOSHIBA	IC10
42	0IR-R934600D	IC,EEPROM	BR93LC46RF-W 8PIN SOP BK EEPROM,1KBIT	ROHM	IC11
43					
44	0IS7LKE005A	TRANSISTOR,BIPOLAR	KRC106S KEC SOT-23 TP TRANSISTOR	KEC	Q1
45	0TRKE80052A	TRANSISTOR,BIPOLAR	KTC3875S NPN 5V 60V 50V 150MA 100NA 70TO700 150MW SOT23 R/TP 3P	KEC	Q2,Q4
46	0TRKE00008A	TRANSISTOR,BIPOLAR	KTB1151 PNP -7V -60V -60V -5A -0.0001A 160TO400 1.5W TO126 ST 3P	KEC	Q3,Q5
47	0TR319809AA	TRANSISTOR,BIPOLAR	KTC3198(KTC1815) NPN 5V 60V 50V 150MA 100NA 70TO700	KEC	Q6
48					
49	0DB360000AA	DIODE,BRIDGE	D3SBA60 600V 1.05V 10UA 80A SIP ST 4P 4	SHINDENGEN	BD1
50	0DZRM001BBA	DIODE,ZENER	RLZ5.6B 5.6V 5.45TO5.73V 130HM 500MW LL34 R/TP 2P 1	ROHM	ZD1,ZD2
51	0DRI07009AA	DIODE,RECTIFIER	FRI07 TP RECTRON D04I 1000V 1A 30A 500NSEC 5A	DELTA	D1,D2,D5-D8
52	0DRSA00070A	DIODE,RECTIFIER	RL2 BK SANKEN D04I 400V 2.0A 40A 0.65EC 10UA	SANKEN	D3,D4
53	0DD400409AC	DIODE,RECTIFIER	IN4004(56MM) TP DO204AL 400V 1A 30A 30UA	DELTA	D9
54					
55	6210JB800IA	FILTER,BEAD	BFS3510A0L 150HM 3.5X10MM AXIAL TP	SAM WHA	FB1
56	6200JB3004A	FILTER,LINE NOISE	CY970020 7A 2MH	TNC	L1
57	EAM50202101	FILTER,LINE NOISE	CY51324D TNC BK 1.3A 24MH	TNC	L2
58	0LRI00IM4F0	INDUCTOR,WIRE WOUND,RADIAL	NH510A00 1MH 20% 1.5KV 1A 10HM 60HZ (NON SHIELD 18.5MM x17MM 12MM TR	TNC	L3,L4
59					
60	0C0474IB670	CAPACITOR,FILM BOX	0.47UF 20% 275V MPP -40TO+85C NON-IND 26X11.5X21MM 22.5MM BK	PILKOR	CM1,CM2
61	0CF473IY470	CAPACITOR,FILM BOX	0.047UF 0.05PF 630V PP -10TO+85C IND 12.5X5X11MM 12.5MM BK	PILKOR	CM3
62	0CK1040K949	CAPACITOR,CERAMIC,AXIAL	100nF -20TO+80% 50V Y5V -25TO+85C 3.5X1.9MM 1.5MM TA52	SAM WHA	CM4
63					
64	0CE476ZV6E0	CAPACITOR,AL,RADIAL	47UF 20% 450V 550MA -25TO+105C WT 2000HR 22X25MM 10MM SNAP IN BK	SAM WHA,SAM YOUNG	CE1
65	0CE226BK638	CAPACITOR,AL,RADIAL	22UF 20% 50V 79MA -55TO+105C WT 1000HR 5X11MM 5MM FORMING TP	SAM WHA,SAM YOUNG	CE2
66	0CE687YHGE0	CAPACITOR,AL,RADIAL	680UF 20% 25V 780A -25TO+80C RD 2000HR 10X12.5MM 10MM DIP BK	SAM WHA,SAM YOUNG	CE3
67	0CE687YJ618	CAPACITOR,AL,RADIAL	680UF 20% 35V 740MA -55TO+105C WT 2000HR 12.5X16MM 5.08MM STRAIGHT TP	SAM WHA,SAM YOUNG	CE4
68	0CE227BF638	CAPACITOR,AL,RADIAL	220UF 20% 16V 251MA -55TO+105C LP 1000HR 8X11.5MM 5MM FORMING TP	SAM WHA,SAM YOUNG	CE5
69	0CE105EK638	CAPACITOR,AL,RADIAL	1UF 20% 50V 13MA -55TO+105C WT 5X11MM 5MM FORMING TP	SAM WHA,SAM YOUNG	CE6,CE13
70	0CE476BH638	CAPACITOR,AL,RADIAL	47UF,KME,RG,YX,25V,20%,FM5,TP5	SAM WHA,SAM YOUNG	CE7
71	0CE227BH638	CAPACITOR,AL,RADIAL	220UF 20% 25V 277MA -55TO+105C LP 1000HR 8X11.5MM 5MM FORMING TP	SAM WHA,SAM YOUNG	CE8,CE14
72	0CE106EK638	CAPACITOR,AL,RADIAL	10UF 20% 50V 54MA -55TO+105C WT 5X11MM 5MM FORMING TP	SAM WHA,SAM YOUNG	CE9-CE12
73					
74	EAE34823301	CAPACITOR,CERAMIC,RADIAL	2.2nF 20% 250V SD -25TO+85C 9X7MM 5MM BK	SAM WHA	CC2,CC10
75	0CK4710K5I9	CAPACITOR,CERAMIC,AXIAL	470pF -20TO+80% 50V Y5P -20TO+85C 2.3X2.0MM 10MM TA52	SAM WHA	CC1
76	0CK1040K949	CAPACITOR,CERAMIC,AXIAL	0.1UF -20TO+80% 50V Y5V -25TO+85C 3.5X1.9MM 1.5MM TA52	SAM WHA	CC3,CC4
77	0CK2230K949	CAPACITOR,CERAMIC,AXIAL	22nF -20TO+80% 50V Y5V -25TO+85C 3.5X1.9MM NONE TA52	SAM WHA	CC12-CC14
78					
79	0CK1040K94A	CAPACITOR,CERAMIC,CHIP	0.1UF,2012,50V,80/-20%,F(Y5V)1,R/TP	MURATA	CC5-CC7,CC23,CC24
80	0CK223DK96A	CAPACITOR,CERAMIC,CHIP	22NF -20TO+80% 50V X7R -55TO+125C 2012 TP	MURATA	CC8,CC15-CC17,CC21,CC22
81	0CK1020K96A	CAPACITOR,CERAMIC,CHIP	1nF 20% 50V X7R -55TO+125C 2012 TP	MURATA	CC9,CC11,CC25
82					
83	EBC3206640I	RESISTOR,SURGE	PRC_03 330KOHM 5% 1W 12X4MM OM AXIAL TA52	SMART	R1
84	EBC3176310I	RESISTOR,SURGE	PRC 560KOHM 5% 1/2W 10X4MM 26MM AXIAL BK	SMART	R2
85	EBC3206650I	RESISTOR,SURGE	PRC_04 56KOHM 5% 2W 15.0X5.5MM 12.5MM AXIAL BK	SMART	R3
86	0RD6801G609	RESISTOR,CARBON FILM	6.8KOHM 5% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	R4
87	0RD4700E609	RESISTOR,CARBON FILM	47 OHM,1/4W,5%,TA52	SMART	R5
88	0RD6800E609	RESISTOR,CARBON FILM	680OHM 5% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	R6
89	0RS010JJ609	RESISTOR,METAL OXIDE FILM	10HM 5% 1W 9.0X3.0MM - AXIAL TA52	SMART	R0CP
90	0RS012JJ609	RESISTOR,METAL OXIDE FILM	1.2OHM 5% 1W 9.0X3.0MM NONE AXIAL TA52	SMART	R0CP
91	0RD3901G609	RESISTOR,CARBON FILM	3.9KOHM 5% 1/4W 6.5X2.3MM - AXIAL TA52	SMART	R15,R49
92	0RD150IH609	RESISTOR,CARBON FILM	1.5KOHM 5% 1/2W 9.0X3.0MM - AXIAL TA52	SMART	R18,R52
93	0RD2001G609	RESISTOR,CARBON FILM	2KOHM 5% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	R19,R38,R53,R55
94	0RD2400H609	RESISTOR,CARBON FILM	240OHM 5% 1/2W 9.0X3.0MM 26.0MM AXIAL TA52	SMART	R24
95	0RD4701G609	RESISTOR,CARBON FILM	4.7KOHM 5% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	R14,R20,R33,R48,R54
96	0RN2612G409	RESISTOR,METAL FILM	26.1KOHM,1/4W,1%,TA52	SMART	RD1,RR1
97	0RNI002G409	RESISTOR,METAL FILM	10KOHM 1% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	RT1
98	0RNI622G409	RESISTOR,METAL FILM	16.2KOHM 1% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	RF1
99					
100	0RJI00IE672	RESISTOR,CHIP	1KOHM 5% 1/8W 2012 R/TP	ROHM	R7,R9
101	0RJI91IE472	RESISTOR,CHIP	9.1KOHM 1% 1/8W 2012 R/TP	ROHM	RL1
102	0RJ240IE472	RESISTOR,CHIP	2.4KOHM 1 1/8W 2012 R/TP	ROHM	RL2
103	0RD200IE672	RESISTOR,CHIP	2KOHM 5% 1/8W 2012 R/TP	ROHM	R8,R35,R37,R39-R44
104	0RD1002E672	RESISTOR,CHIP	10KOHM,1/8W,5%,2012,R/TP	ROHM	R16,R45-R47,R50,R63-R72,R77-R85
105	0RH470IL622	RESISTOR,CHIP	4.7KOHM,1/8W,5%,2012,D	ROHM	R12,R34,R86-R89,R73-R76,R87-R91
106	0RJ2400H680	RESISTOR,CHIP	2400HM 5% 1/2W 5025 R/TP	ROHM	R25-R32
107	0RH2200L622	RESISTOR,CHIP	2200HM 5% 1/8W 2012 R/TP	ROHM	R10
108	0RH1004L622	RESISTOR,CHIP	1MOHM,1/8W,5%,2012,R/TP	ROHM	R11
109	0RH3300L622	RESISTOR,CHIP	3300HM 5% 1/8W 2012 R/TP	ROHM	R17,R51
110	0RH1000L622	RESISTOR,CHIP	1000HM 5% 1/8W,5%,2012,R/TP	ROHM	R36,R86
111	0RJI500E672	RESISTOR,CHIP	1500HM 5% 1/8W 2012 R/TP	ROHM	R60-R62
112					
113					
114	1SBF030241B	SCREW,TAPTITE	BH + S 3MM 8MM M3WR FZY	HAENG SUNG	-
115	4920JB3007A	HEAT,SINK	23.3*17*25 DRIVE IC STR R-S64,65,73 2PIN 1-SCREW 3MM -	(IC2)	(IC2)
116	6908JB3002F	BUZZER,PIEZO	85DB 30V 2KHZ 22X25.5X7MM PIN	DAE YOUNG	BUZZER
117	6954S50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	DAE A LEAD	JCR1-JCR4, FB1(15MM)
118	6620PR00006B	SWITCH,TACT	JPT1212B JEIL 12VDC 50MA	NAMAE	TEST S/W
119	SS00000089A	SOLDER (ROSIN WIRE) RSO	SR-34 RB-FREE, LFM-48	-	-
120	SSWZU-L05AA	SOLDER,SOLDERING	LFM-38, SN 3.0AG -0.5CU% 3.0MM	HUISUNG	-
121	7245ZB0004A	FLUX	SV-PBF-06 KSK 12.5 WT% 0.815+-0.003	KOKI	-

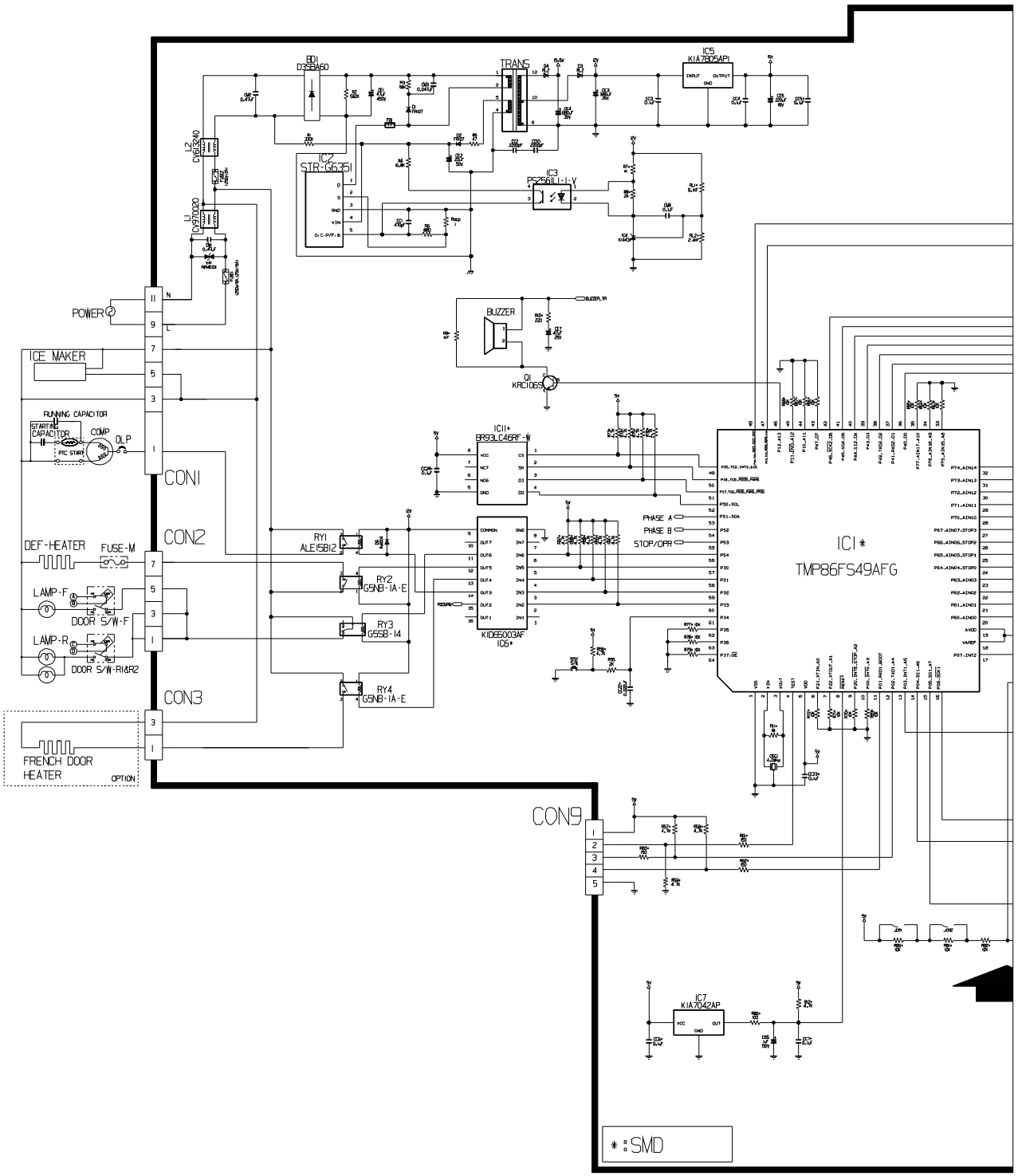
8-5-3 PWB Assembly, Display and Parts List

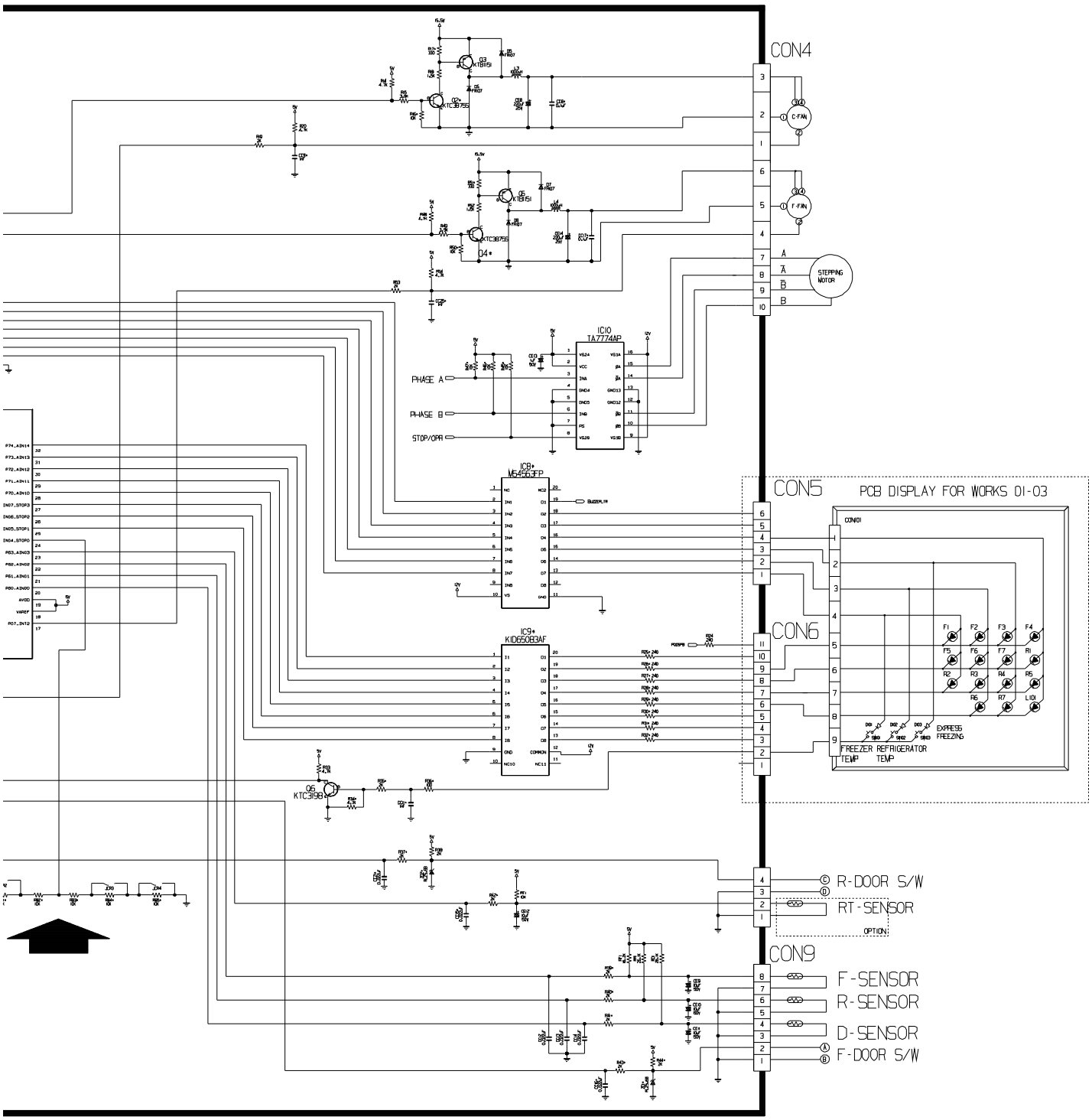


Qty	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	1	6870JB8091A	PWB(PCB)	KS-PJT GOOD/BETTER DISPLAY	DOO SAN	t=1.6
	2					
1	3	6630AQ9159H	WAFER	SMAW250-09	YEON HO	CON101
	4					
2	5	6600RRT002K	SWITCH,TACT	JTP1230A JEIL 12V DC 50MA	JEIL	SW101,102
		6600JB8005A		KPT-1105A	KYUNG IN	
1	6	-	TACT S/W	KPT-1109G	KYUNG IN	SW103
14	7	0DLLE0019AA	LED	LT1824-81-BCM TP GREEN 2		R1~R7,F1~F7
3	8	0DD414809AA	DIODE,SWITCHING	1N4148 26MM	PYUNG CHANG DELTA	D101,102,103
12	10	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN (10MM)	-	J101~J112
	11					
-	12	9VWF0120000	SOLDER(ROSIN WIRE) RSO	D1.20	HEE SUNG	-
0.01	13	49111004	SOLDER,SOLDERING	H63A	-	-
0.0005	14	59333105	FLUX	SG;0.825-0.830 KOREA F.H-206	KOKI	-

8-6 PWB DIAGRAM

8-6-1 PWB Main Assembly

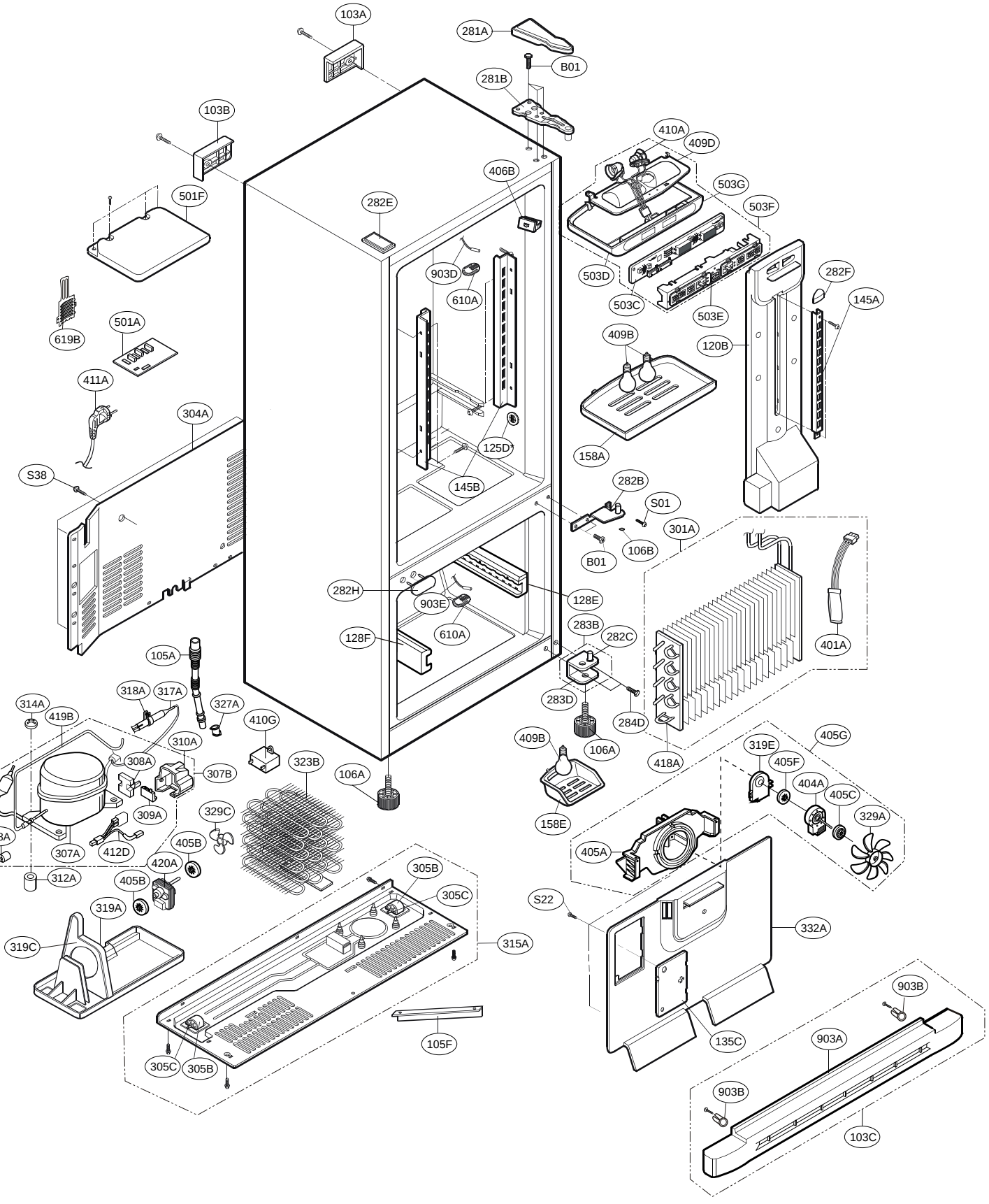



CON4
C-FAN
F-FAN
STEPPING MOTOR
A
Ā
B
B̄
IC10
TA7774AP
PHASE A
PHASE B
STOP/OPR
IC8
M54563FP
IC9
KID65083AF
CON5
PCB DISPLAY FOR WORKS 01-03
CON01
CON6
F1
F2
F3
F4
F5
F6
F7
R1
R2
R3
R4
R5
R6
R7
LI01
EXPRESS FREEZING
FREEZER TEMP
REFRIGERATOR TEMP
R-DOOR S/W
RT-SENSOR
OPTION
CON9
F-SENSOR
R-SENSOR
D-SENSOR
F-DOOR S/W

10. EXPLODED VIEW

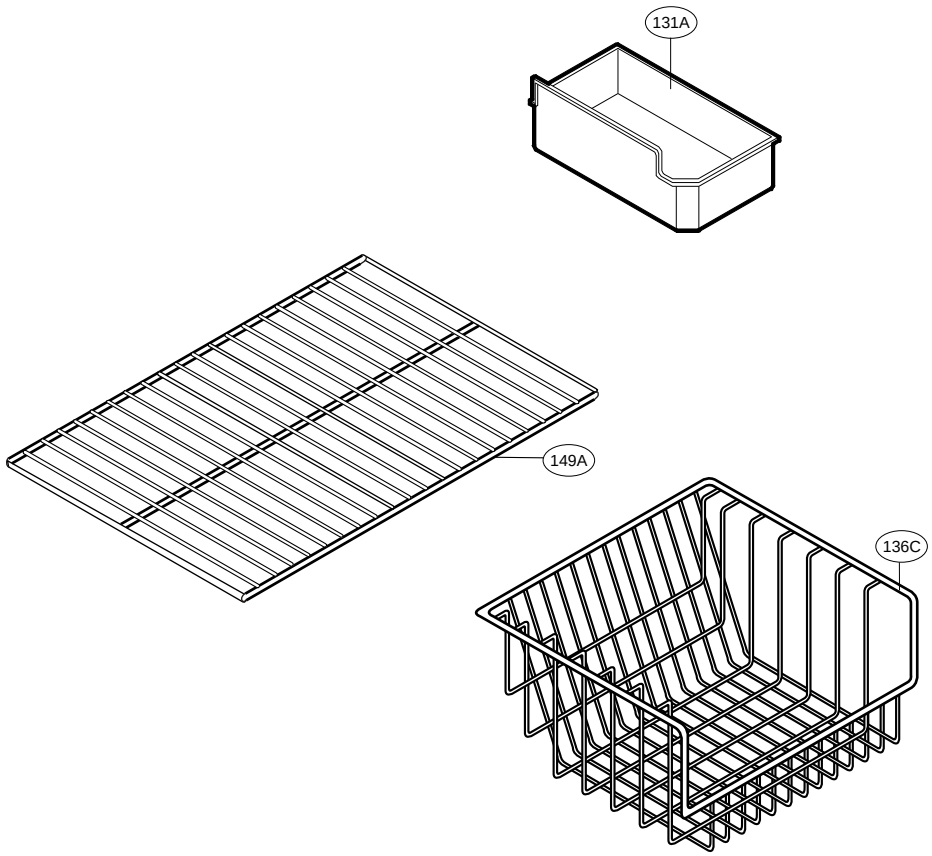
CASE PARTS

CAUTION: Use the part number to order part, not the position number.



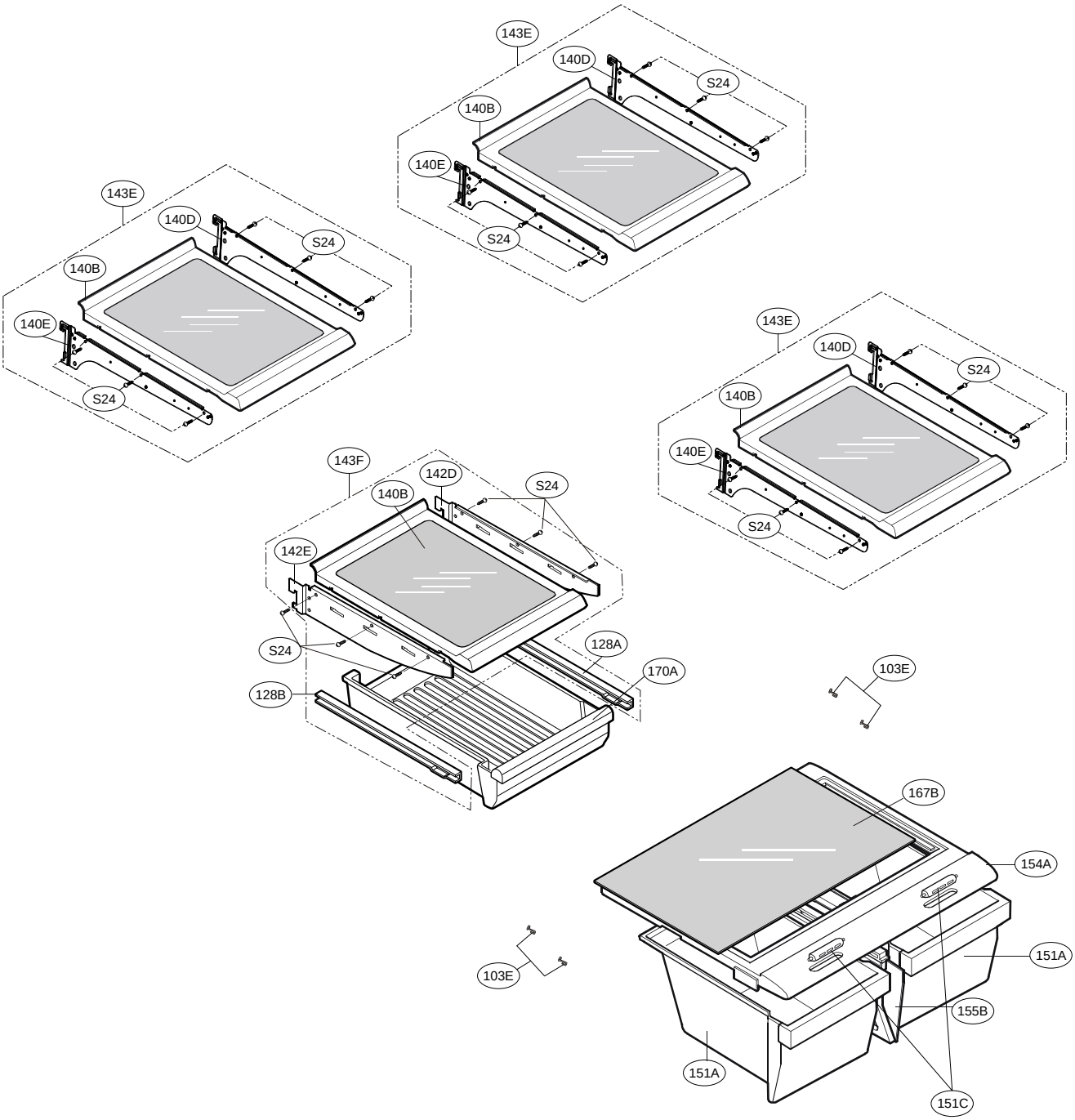
FREEZER PARTS

CAUTION: Use the part number to order part, not the position number.



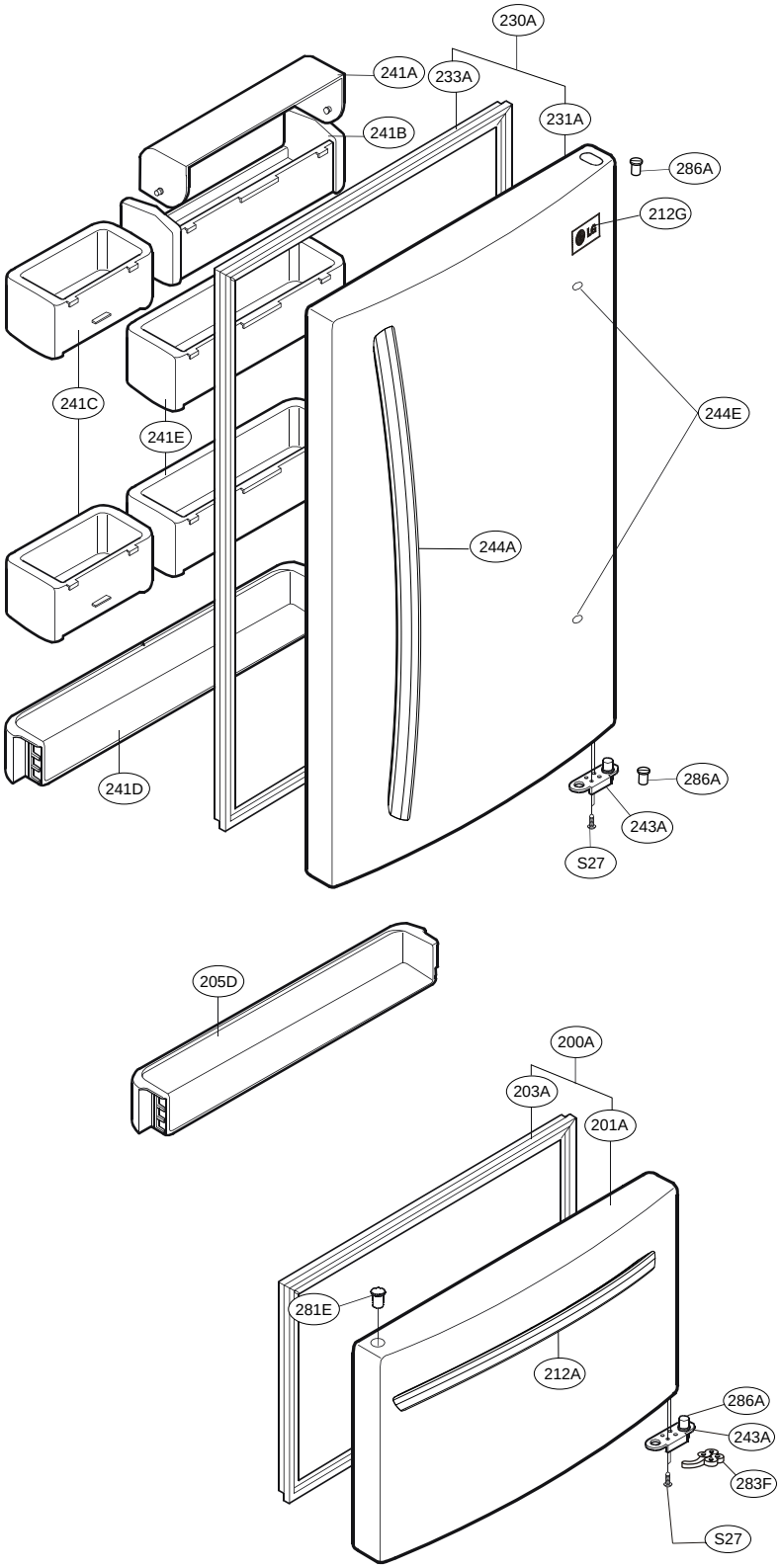
REFRIGERATOR PARTS

CAUTION: Use the part number to order part, not the position number.



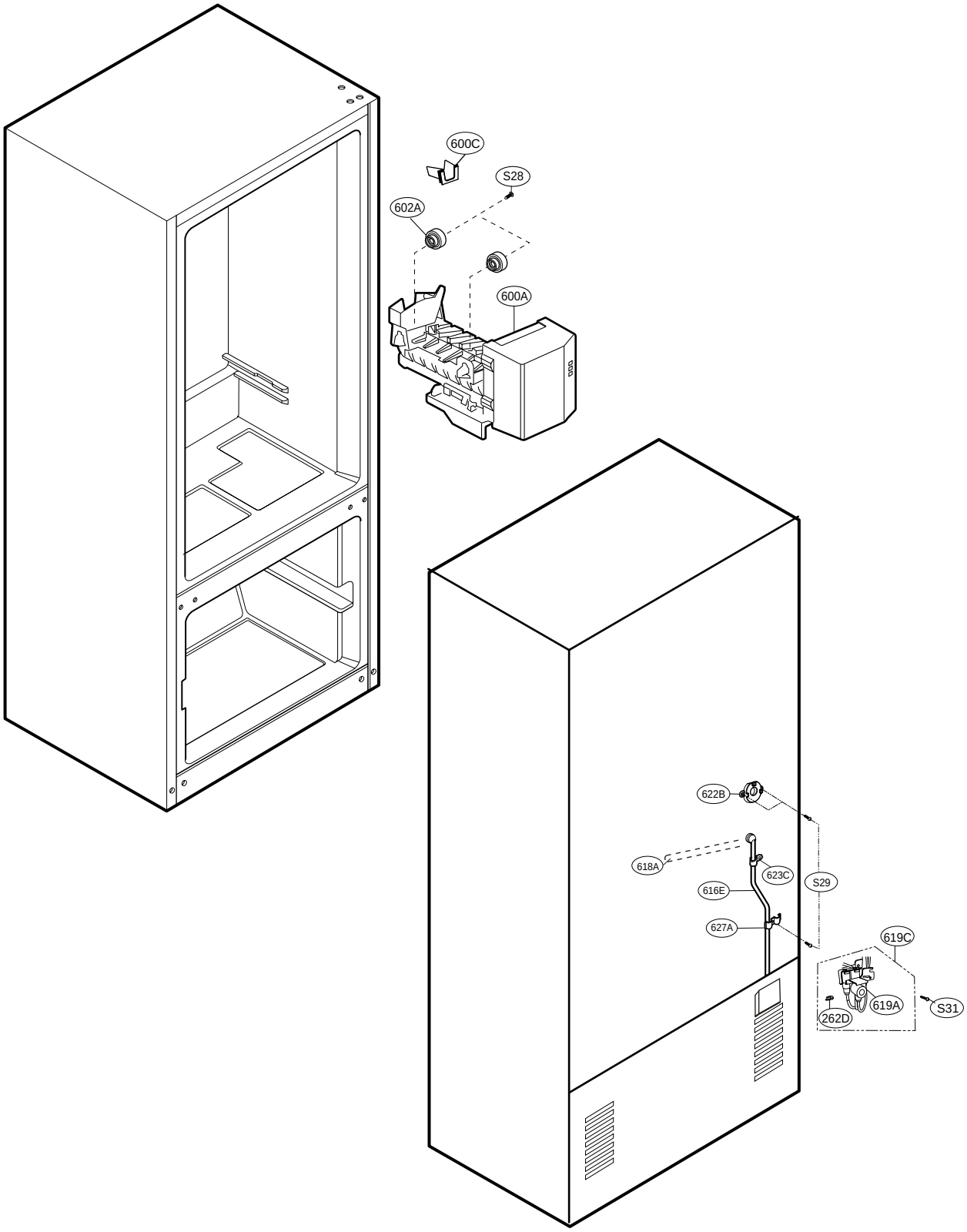
DOOR PARTS

CAUTION: Use the part number to order part, not the position number.



WATER & ICE MAKER PARTS

CAUTION: Use the part number to order part, not the position number.



LG Electronics Inc.

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